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ABSTRACT

This document presents the basic test data obtained during the Lift-Propulsive Force Limit Wind Tunnel Test conducted during 1976 at the Boeing Vertol Wind Tunnel. Included are the rotor control positions, blade loads and six components of rotor force and moment, corrected for hub tares. Performance and blade loads are presented as the rotor lift limit is approached at fixed levels of rotor propulsive force coefficients and rotor tip speeds. Performance and blade load trends are presented for fixed levels of rotor lift coefficient as propulsive force is increased to the maximum obtainable by the model rotor. Test data is also included that defines the effect of stall proximity on rotor control power. This test data is presented in Volume II and III. The analysis of the data is presented in Volume I.

FOREWORD

This report was prepared by the Boeing Vertol Company for the National Aeronautics and Space Administration, Langley Research Center, under NASA contract NAS1-14317. It presents the test data and analysis from the Lift-Propulsive Force Limit Wind Tunnel Test. The analysis of the data establishes the useful flight envelope and the characteristics of a conventional rotor in high speed flight. The results are presented in three volumes.

- 1 Wind Tunnel Investigation of Rotor Lift and
Propulsive Force Limits at High Speed -
- Data Analysis -
- 2 Wind Tunnel Investigation of Rotor Lift and
& -3 Propulsive Force Limits at High Speed -
- Test Data Appendix -

Mr. J. L. Jenkins (NASA Langley) was the technical monitor for this work.

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NOMENCLATURE

<u>Symbol</u>	<u>Definition</u>	<u>Units</u>
A	Rotor Area (πR^2)	m ² (ft ²)
A ₁ , a ₁	1st Harmonic Longitudinal Flapping Angle	rad(deg)
A ₁	Lateral Cyclic (-θ at ψ = 0°)	rad(deg)
B ₁ , b ₁	1st Harmonic Lateral Flapping Angle	rad(deg)
B ₁	Longitudinal Cyclic (-θ at ψ = 90°)	rad(deg)
CB12	Alternating Root Chord Bending Moment at 12% Blade Radius (P+P)/2	kg-m(in-lb)
CB53	Alternating Mid Span Chord Bending Moment at 53% Blade Radius (P+P)/2	kg-m(in-lb)
CDE/SB	Rotor Effective Drag Coefficient = $D_E / \rho A V_{TIP}^2 \sigma$	
CH/SB	Rotor Longitudinal Force Coefficient = $H_{FORCE} / \rho A V_{TIP}^2 \sigma$	
CPMB	Rotor Pitching Moment = $PM / \rho A V_{TIP}^2 R$	
CP/SB	Rotor Power Coefficient = $Q / \rho A V_{TIP}^2 R \sigma$	
CRMB	Rotor Rolling Moment Coefficient = $RM / \rho A V_{TIP}^2 R$	
CT'/SB	Rotor Lift Coefficient = $L / \rho A V_{TIP}^2 \sigma$	
CX/SB	Rotor Propulsive Force Coefficient = $X / \rho A V_{TIP}^2 \sigma$	
CY/SB	Rotor Side Force Coefficient = $S.F. / \rho A V_{TIP}^2 \sigma$	
FB12	Alternating Root Flap Bending at 12% Blade Radius (P+P)/2	kg-m(in-lb)
FB22	Alternating Inboard Flap Bending Moment at 22% Blade Radius (P+P)/2	kg-m(in-lb)

<u>Symbol</u>	<u>Definition</u>	<u>Units</u>
FB48	Alternating Mid Span Flap Bending Moment at 48% Blade Radius $(P+P)/2$	kg-m(in-lb)
FB79	Alternating Outboard Flap Bending Moment at 79% Blade Radius $(P+P)/2$	kg-m(in-lb)
PM	Hub Pitching Moment	m-kg(ft-lb)
Q	Rotor Torque	kg-m(lb-ft)
R	Rotor Radius	m(ft)
RM	Hub Rolling Moment	m-kg(ft-lb)
SF	Rotor Side Force	kg(lb)
T	Rotor Thrust	kg(lb)
TB12	Alternating Root Torsion at 12% Blade Radius = $(P+P)/2$	kg-m(in-lb)
TB20	Alternating Inboard Torsion at 20% Blade Radius = $(P+P)/2$	kg-m(in-lb)
TB51	Alternating Mid Span Torsion at 51% Blade Radius = $(P+P)/2$	kg-m(in-lb)
TB81	Alternating Outboard Torsion at 81% Blade Radius = $(P+P)/2$	kg-m(in-lb)
V	Tunnel Velocity	m/s(ft/s)
V _{TIP}	Rotor Tipspeed	m/s(ft/s)
X	Rotor X Force	kg(lb)
α_s	Shaft Angle of Attack	rad(deg)
θ	Collective Pitch	rad(deg)
μ	Advance Ratio = V/V_{TIP}	

<u>Symbol</u>	<u>Definition</u>	<u>Units</u>
ρ	Tunnel Density	$\text{N/m}^2 (\text{slugs/ft}^2)$
σ	Rotor Solidity $bc/\pi R$	

A. Basic Test Data from Lift Limit Testing

As indicated in Section 5 of the main report, the lift limit testing was conducted at fixed levels of propulsive force by increasing the collective pitch, increasing the rotor shaft angle of attack and trimming the hub moment to zero with longitudinal and lateral cyclic. This was repeated at each propulsive force level and advance ratio for the basic rotor tip speed of 620 ft/sec. Similar testing was accomplished at a tip speed of 570 ft/sec.

The test data obtained for each of these test runs has been combined to show the impact of advance ratio at a fixed level of propulsive force or conversely the impact of propulsive force at a fixed advance ratio. The combinations, identified as plot sets, are defined in Table A-1 and are marked on the bottom of each sheet. Within each plot set are a series of graphs presenting the variation of each component of measured data with rotor lift coefficient. The sequence of these graphs is as follows:

Rotor Lift Coefficient versus Rotor Propulsive
Force Coefficient

Rotor Lift Coefficient versus Shaft Angle of Attack

Rotor Lift Coefficient versus Collective Pitch

Rotor Lift Coefficient versus Longitudinal Cyclic

Rotor Lift Coefficient versus Lateral Cyclic

Rotor Lift Coefficient versus Rotor Power Coefficient

Rotor Lift Coefficient versus Rotor Pitching Moment Coefficient

Rotor Lift Coefficient versus Rotor Rolling Moment Coefficient

Rotor Lift Coefficient versus Rotor Longitudinal Force
Coefficient

Rotor Lift Coefficient versus Rotor Side Force Coefficient

Rotor Lift Coefficient versus Alternating Root Torsion TB12

Rotor Lift Coefficient versus Alternating Inboard Torsion TB20

Rotor Lift Coefficient versus Alternating Mid Span Torsion TB51

Rotor Lift Coefficient versus Alternating Outboard Torsion TB81

Rotor Lift Coefficient versus Alternating Root Flap Bending FB12

Rotor Lift Coefficient versus Alternating Inboard Flap Bending FB22

Rotor Lift Coefficient versus Alternating Mid Span Flap Bending FB48

Rotor Lift Coefficient versus Alternating Root Chord Bending CB12

Rotor Lift Coefficient versus Alternating Mid Span Chord CB53

Rotor Lift Coefficient versus Coning Angle

Rotor Lift Coefficient versus 1st Harmonic Longitudinal Flapping A1

Rotor Lift Coefficient versus 1st Harmonic Lateral Flapping B1

Rotor Lift Coefficient versus Alternating Lead-Lag Angle

Rotor Pitching Moment Coefficient versus 1st Harmonic Longitudinal Flapping A1

Rotor Rolling Moment Coefficient versus 1st Harmonic Lateral Flapping B1

TABLE A-1 DATA PLOTTING SUMMARY FOR LIFT LIMIT TESTING

PLOT SET	RUN NO.	ROTOR TIP SPEED V_T	ADVANCE RATIO μ	ROTOR LIFT COEFF. G_L/σ	ROTOR PROPULSIVE FORCE COEFF. $X/qd^2\sigma$	TUNNEL SPEED V	COMMENTS
1	22	620FPS	0	Range	-	0	Baseline hover performance and lift limit.
	23	620FPS	0	Range	-	0	
	24	620FPS	0	Range	-	0	
2	25	620FPS	.10	Range	.05	62FPS	Baseline cruise performance.
	27	620FPS	.20	Range	.05	124FPS	
	28	620FPS	.20	Range	.05	124FPS	
	29	620FPS	.30	Range	.05	186FPS	
	30	620FPS	.40	Range	.05	248FPS	
3	32	620FPS	.40	Range	.01	248FPS	
	30	620FPS	.40	Range	.05	248FPS	
	33	620FPS	.40	Range	.10	248FPS	
	34	620FPS	.40	Range	.20	248FPS	
4	35	620FPS	.45	Range	.01	279FPS	
	36	620FPS	.45	Range	.05	279FPS	
	37	620FPS	.45	Range	.10	279FPS	
	38	620FPS	.45	Range	.20	279FPS	
5	40	620FPS	.50	Range	.025	310FPS	
	39	620FPS	.50	Range	.05	310FPS	
	41	620FPS	.50	Range	.10	310FPS	
	42	620FPS	.50	Range	.20	310FPS	

TABLE A-1 DATA PLOTTING SUMMARY FOR LIFT LIMIT TESTING
(Continued)

PLOT SET	RUN NO.	ROTOR TIP SPEED V_T	ADVANCE RATIO μ	ROTOR LIFT COEFF. G_L/σ	ROTOR PROPULSIVE FORCE COEFF. $X/qd^2\sigma$	TUNNEL SPEED V	COMMENTS
7	51	620FPS	.53	Range	.025	329FPS	Baseline cruise performance and lift limit.
	50	620FPS	.53	Range	.05	329FPS	
	52	620FPS	.53	Range	.10	329FPS	
	53	620FPS	.53	Range	.20	329FPS	
34	227	620FPS	.45	Range	.05	279FPS	Check & verification runs to insure compatibility of data from Part 1 and Part 2. Runs 225 & 227 are operating with tip stall.
	36	620FPS	.45	Range	.05	279FPS	
35	225	620FPS	.50	Range	.05	310FPS	
	39	620FPS	.50	Range	.05	310FPS	
36	225	620FPS	.50	Range	.05	310FPS	Check runs to define repeatability. Rotor operating with tip stall.
	261	620FPS	.50	Range	.05	310FPS	
	226	620FPS	.50	Range	.10	310FPS	
37	224	620FPS	.53	Range	.05	328FPS	Check runs.
	220	620FPS	.53	Range	.05	328FPS	
	221	620FPS	.53	Range	.05	328FPS	
	222	620FPS	.53	Range	.05	328FPS	
38	246	620FPS	.57	Range	.025	353FPS	Baseline cruise performance and lift limit.
	249	620FPS	.57	Range	.025	353FPS	
	228	620FPS	.57	Range	.05	353FPS	
	245	620FPS	.57	Range	.10	353FPS	

TABLE A-1 DATA PLOTTING SUMMARY FOR LIFT LIMIT TESTING
(Continued)

PLOT SET	RUN NO.	ROTOR TIP SPEED V_T	ADVANCE RATIO μ	ROTOR LIFT COEFF. G_L/σ	ROTOR PROPULSIVE FORCE COEFF. $X/qd^2\sigma$	TUNNEL SPEED V	COMMENTS
39	229	620FPS	.61	Range	.05	378FPS	Baseline cruise performance and lift limit.
	248	620FPS	.61	Range	.075	378FPS	
40	250	570FPS	.40	Range	.05	228FPS	Baseline Cruise performance and lift limit at reduced tip speed. Comparison of operation with and without tip stall.
	256	570FPS	.40	Range	.05	228FPS	
41	251	570FPS	.45	Range	.05	256FPS	
	255	570FPS	.45	Range	.05	256FPS	
42	252	570FPS	.50	Range	.05	285FPS	
	254	570FPS	.50	Range	.05	285FPS	

Figure A-1

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU'	X/00258	VTUN
□	22	0		□
△	23	0		□
◇	24	0		□

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PROPULSIVE FORCE COEFFICIENT

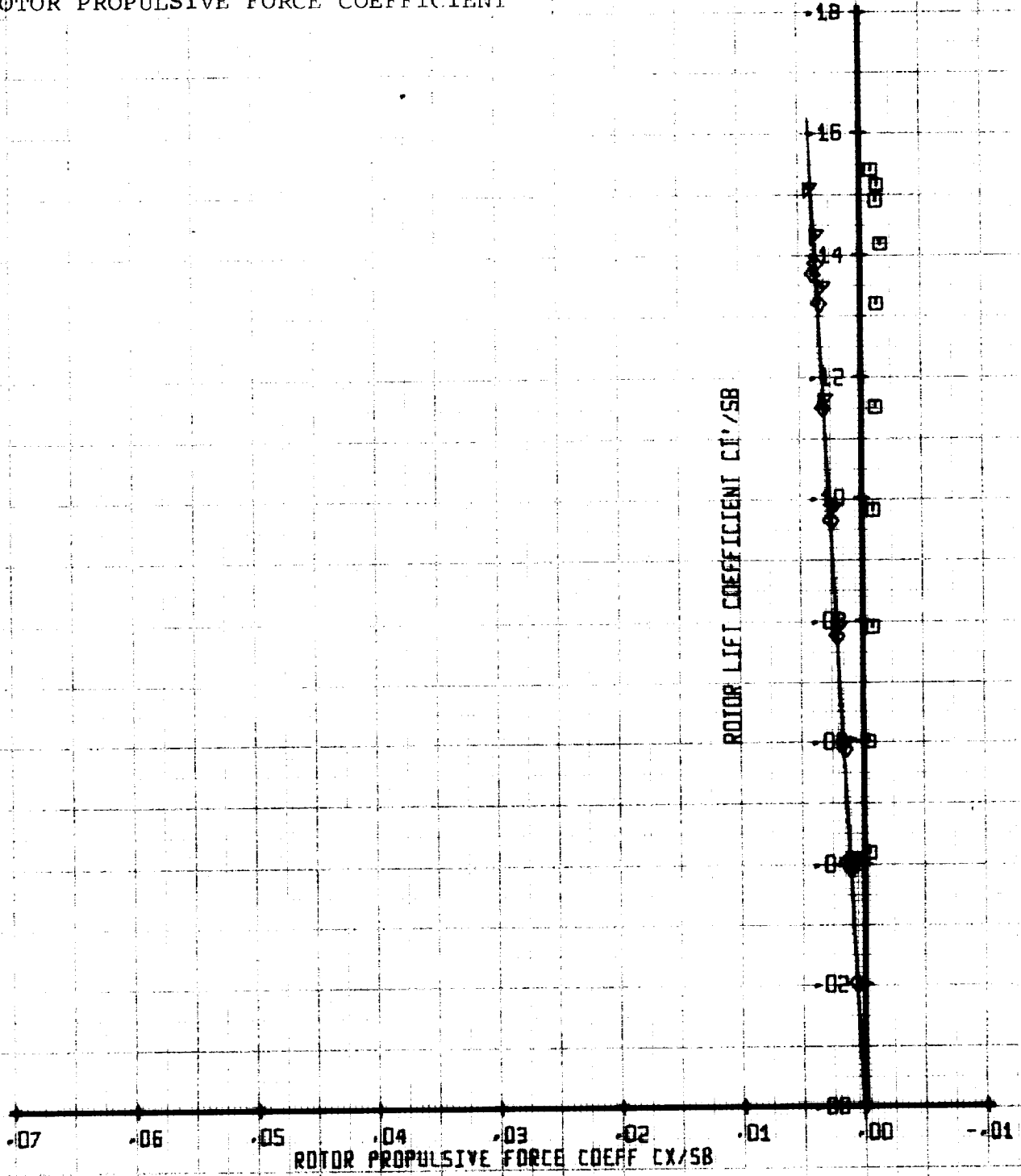


Figure A-2

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

SYM

RUN

LEGEND

MU

X/00298

VTUN

0

22

0

-

0

0

23

0

-

0

0

24

0

-

0

ROTOR LIFT COEFFICIENT

VERSUS

SHAFT ANGLE OF ATTACK

ROTOR LIFT COEFFICIENT C_L'/S_B

-70.0 -60.0 -50.0 -40.0 -30.0 -20.0 -10.0 00.0 10.0

SHAFT ANGLE OF ATTACK - DEGREES

-1.2

-1.0

-0.8

-0.6

-0.4

-0.2

0.0

0.2

SHAFT ANGLE OF ATTACK - RADIANS

SET 1
BVWT 187

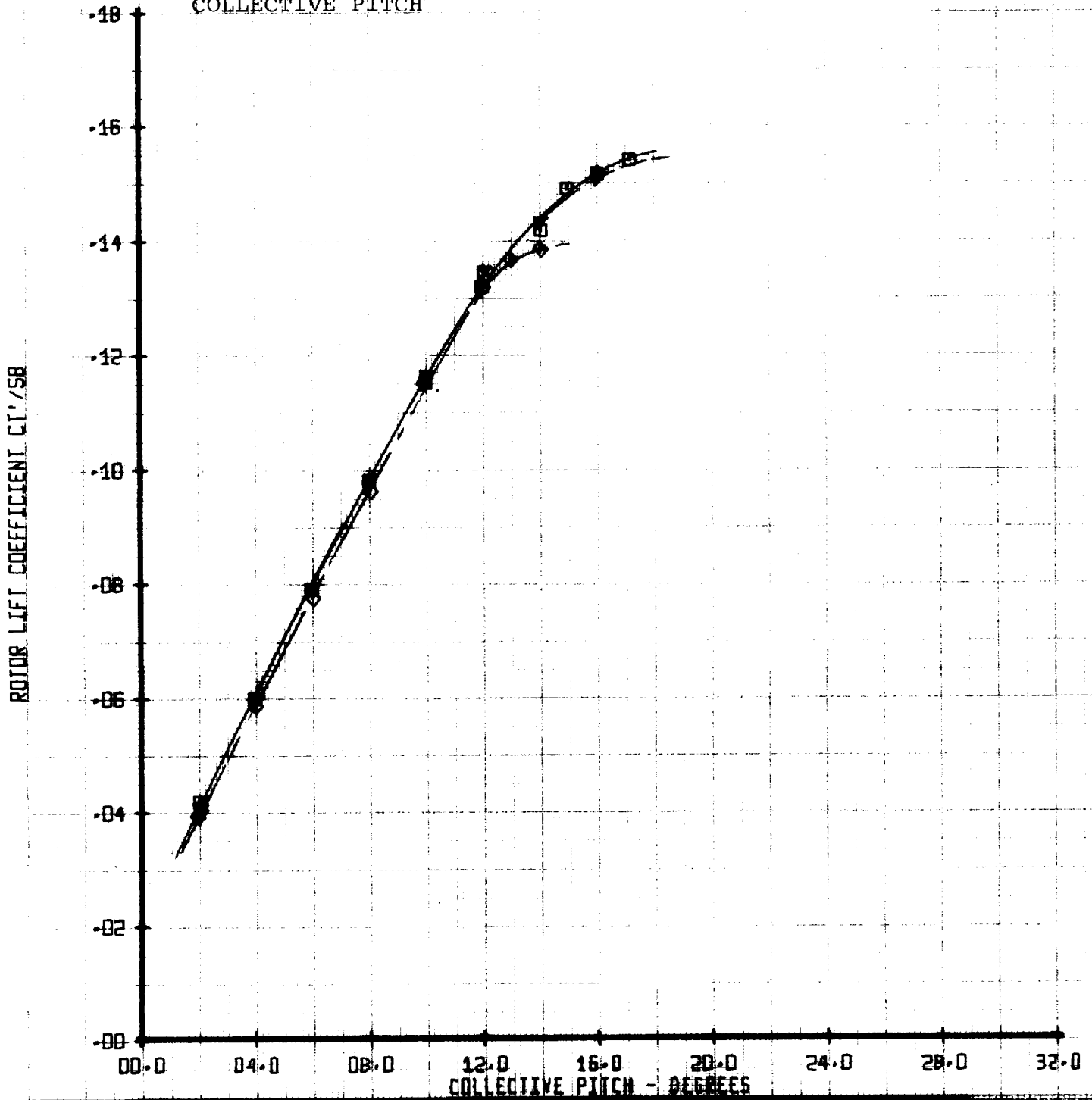
ET 1
WT 187

Figure A-3

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	VTUN
040	22	00	-	000
040	23	00	-	000
040	24	00	-	000

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH



COLLECTIVE PITCH - DEGREES

SET 1
BVWT 187

Figure A-4

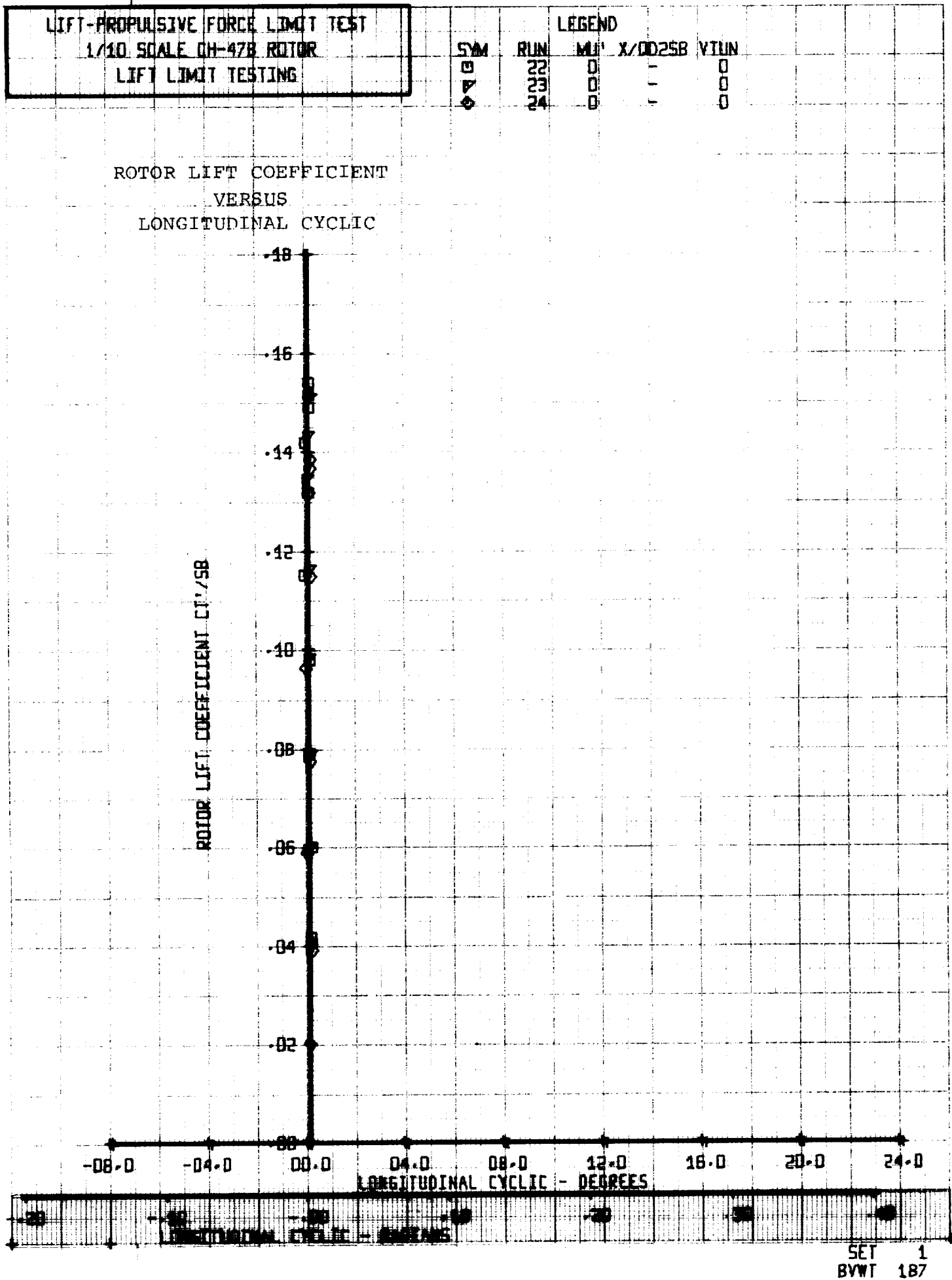


Figure A-5

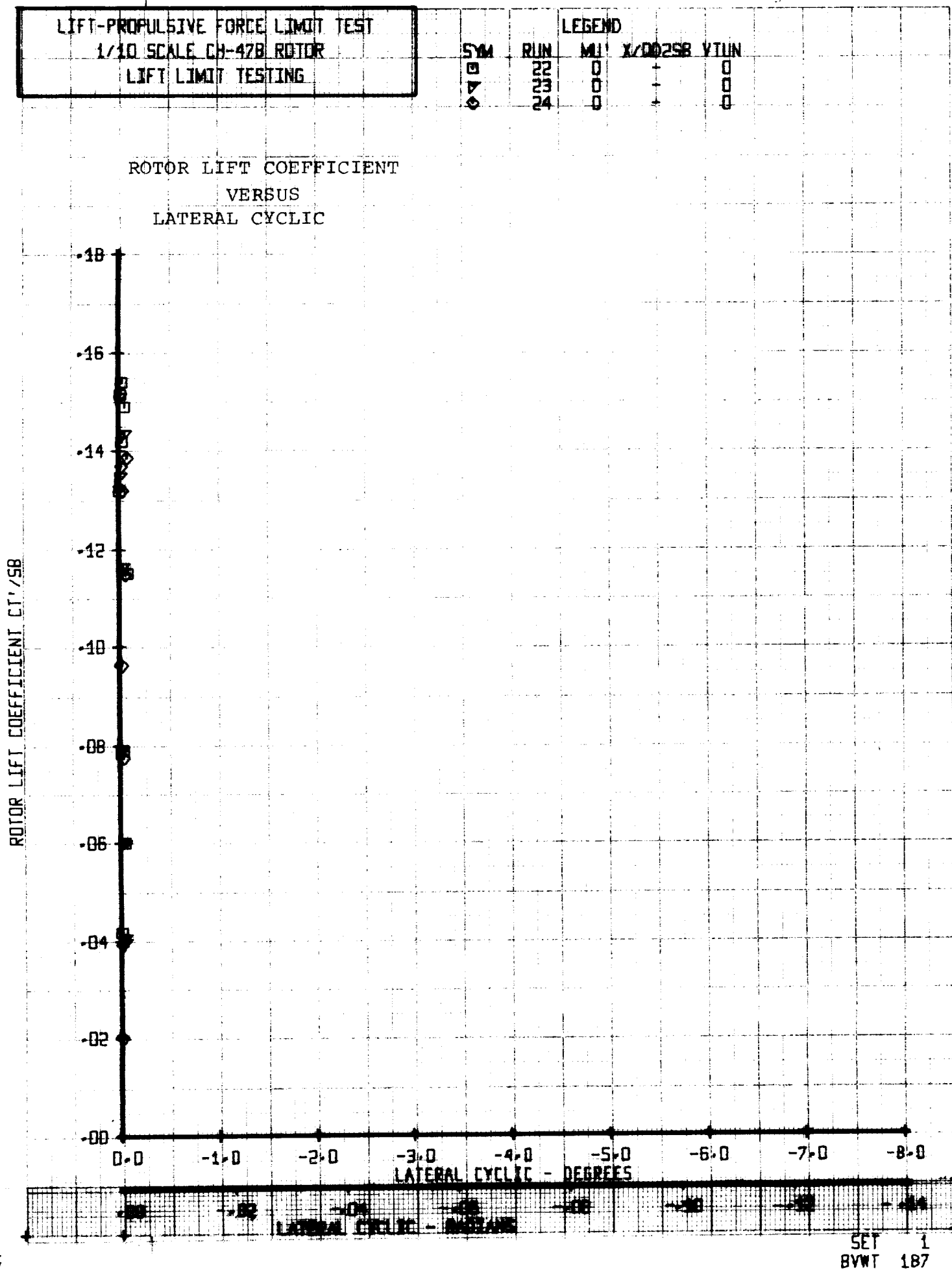


Figure A-6

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/0025B	VTUN
□	22	0	+	0
△	23	0	+	0
◇	24	0	+	0

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT

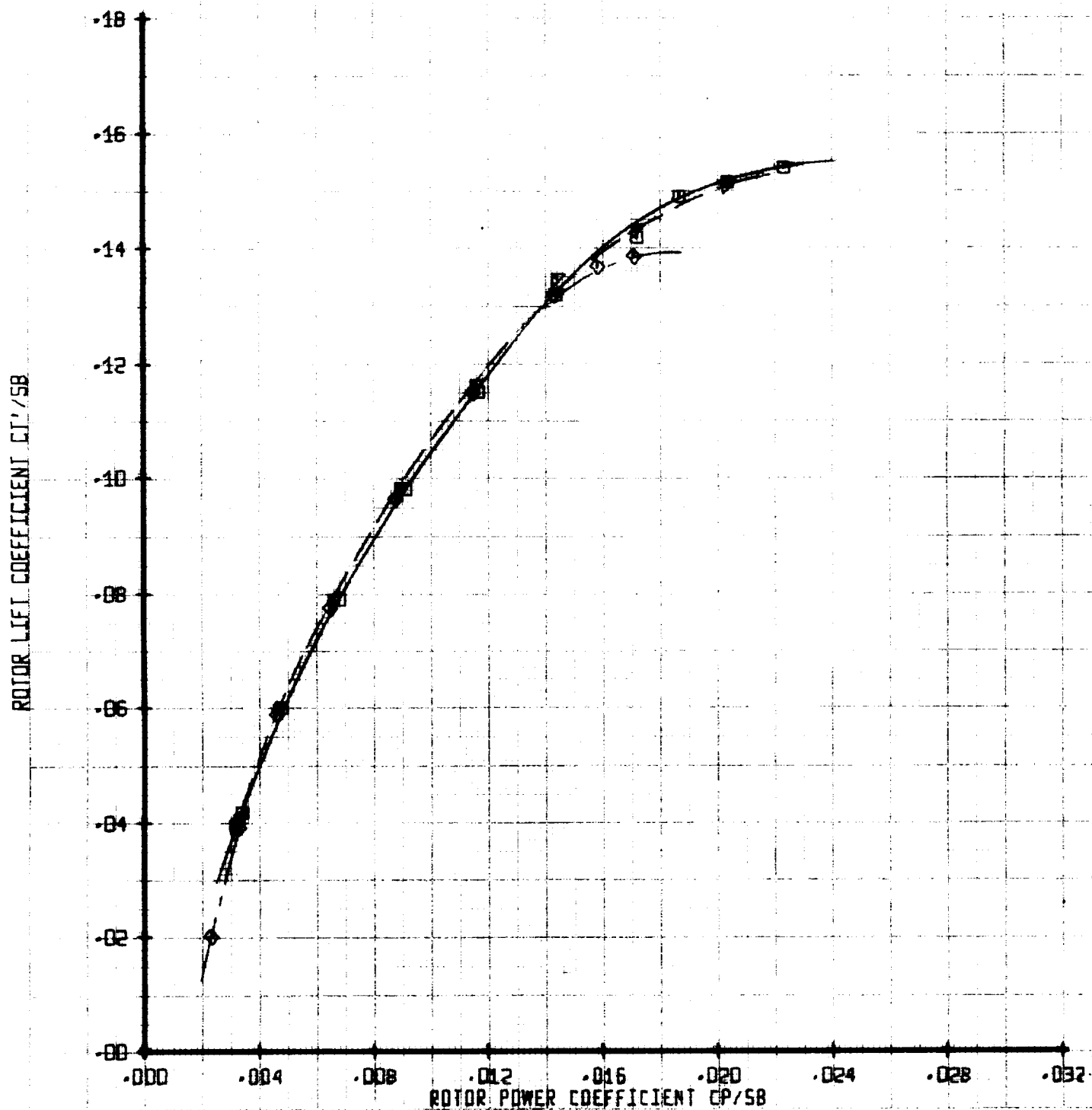


Figure A-7

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	22	0	1	0
△	23	0	1	0
◇	24	0	1	0

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

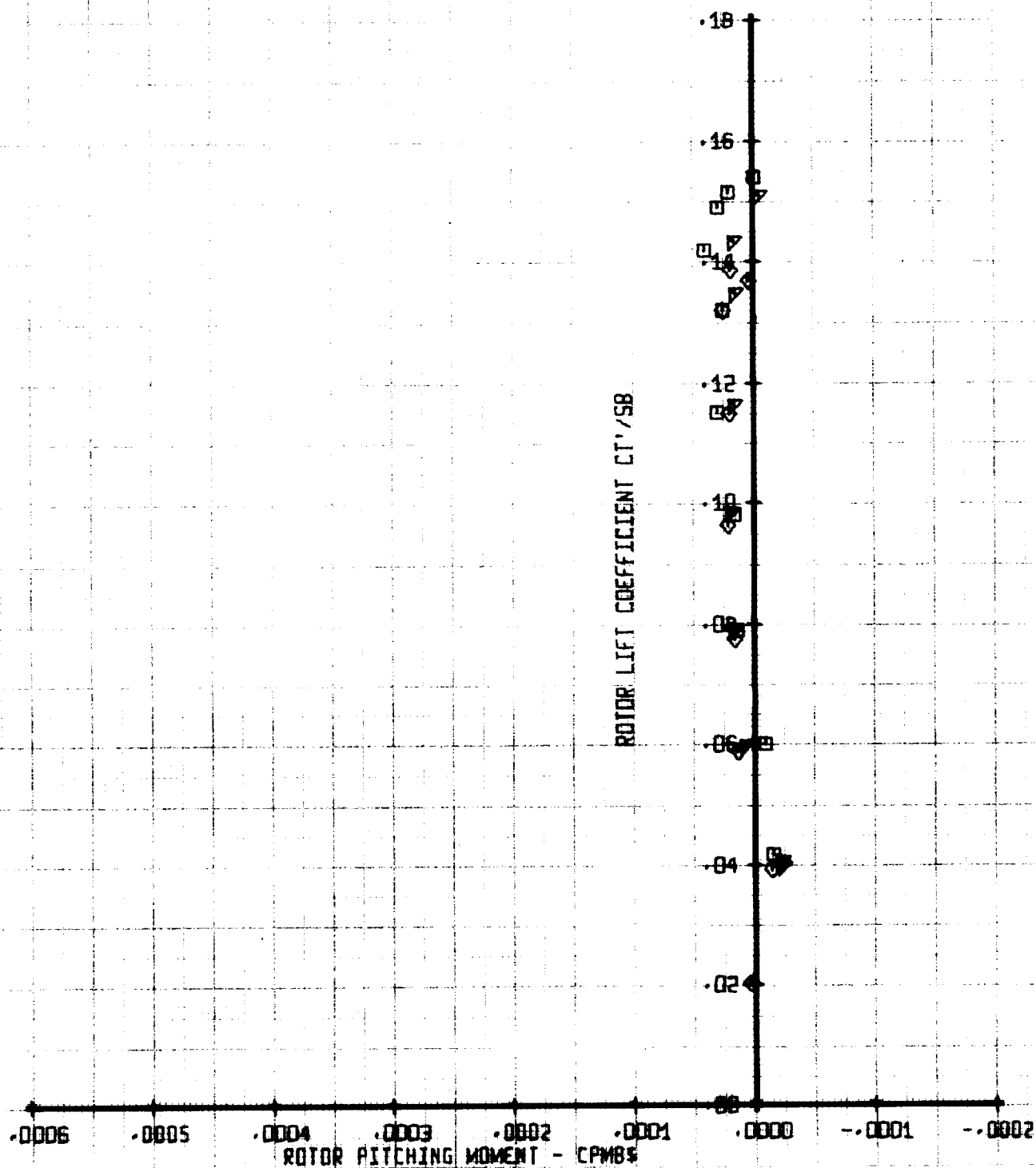


Figure A-8

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

SYM

RUN

 22
23
24

LEGEND

MU

 0
0
0

X/00298

 -
-
-

VTUN

 0
0
0

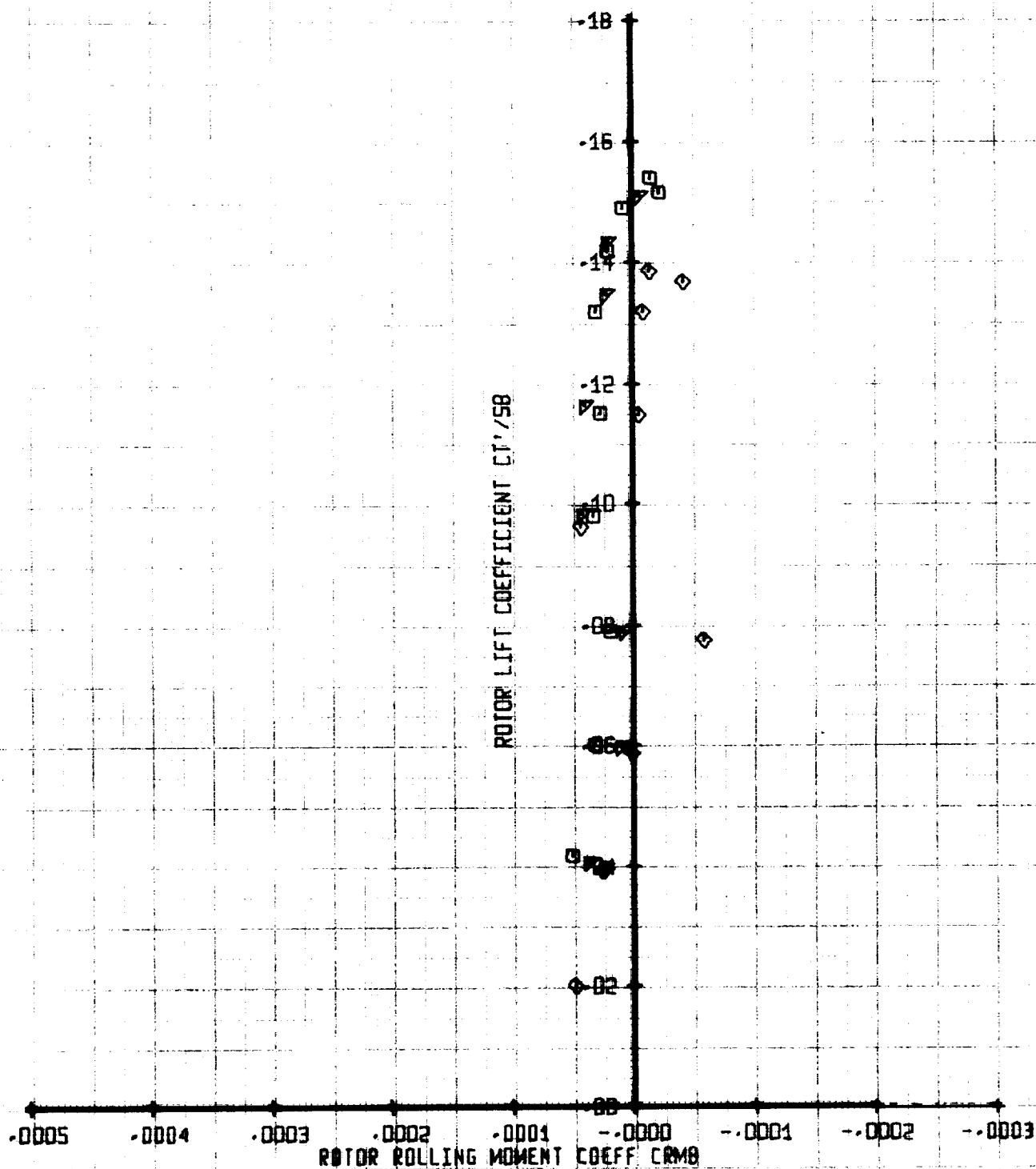
 ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT

 SET 1
BVWT 187

Figure A-9

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

SYM
0
4
0RUN
22
23
24

LEGEND

ML
0
0
0X/00298 VTUN
-
-
-VTUN
0
0
0

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT

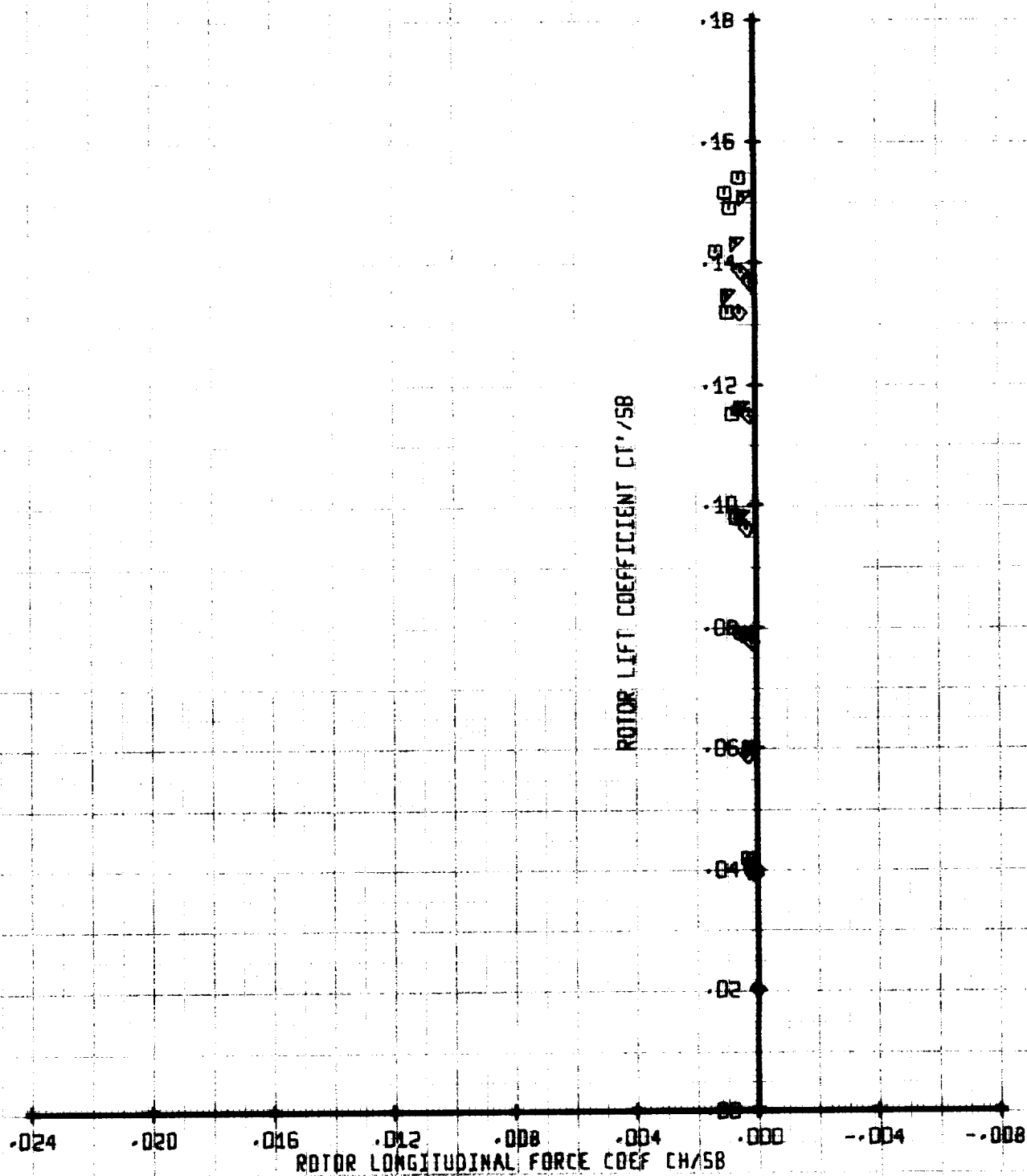


Figure A-10

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	22	0	+	0
△	23	0	+	0
◇	24	0	+	0

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT

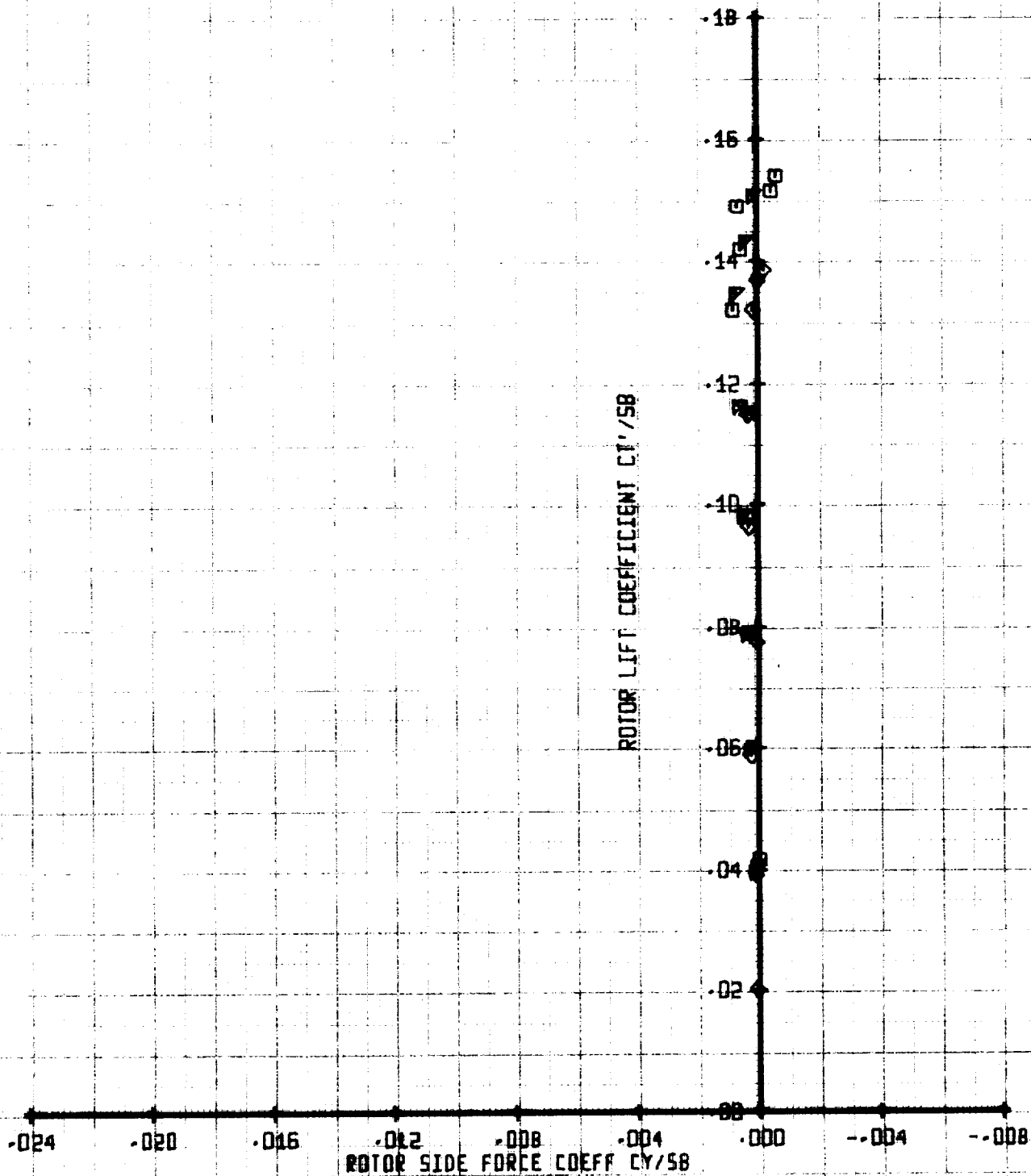


Figure A-11

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

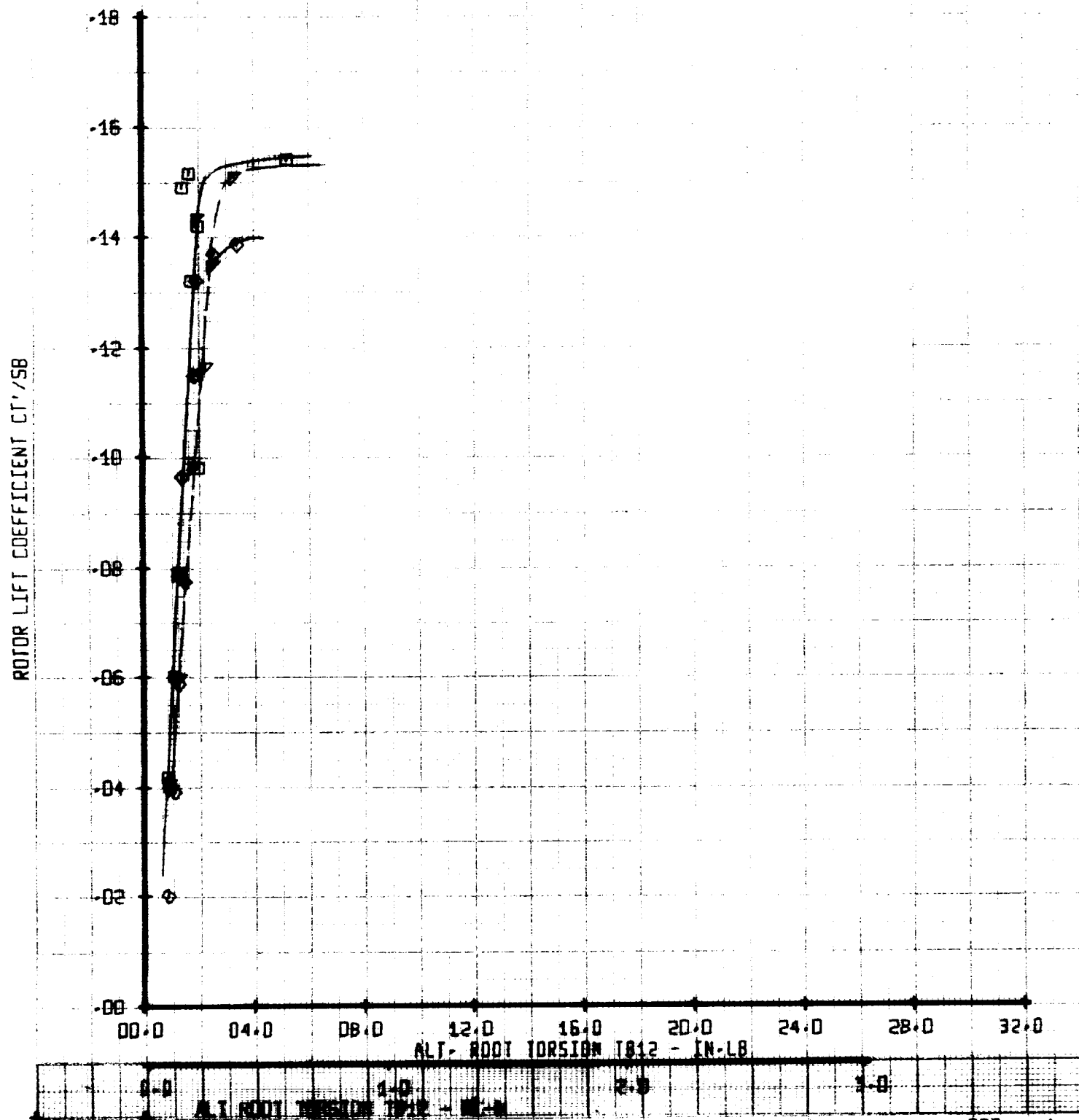
LIFT LIMIT TESTING

SYM
00
00
00RUN
22
23
24

LEGEND

ML' X/00250 VTUN
00 -
00 -
00 -

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12



SET 1
BYWT 187

Figure A-12

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU'	X/00258	VTUN
0	22	0	-	0
0	23	0	-	0
0	24	0	-	0

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING INBOARD TORSION TB20

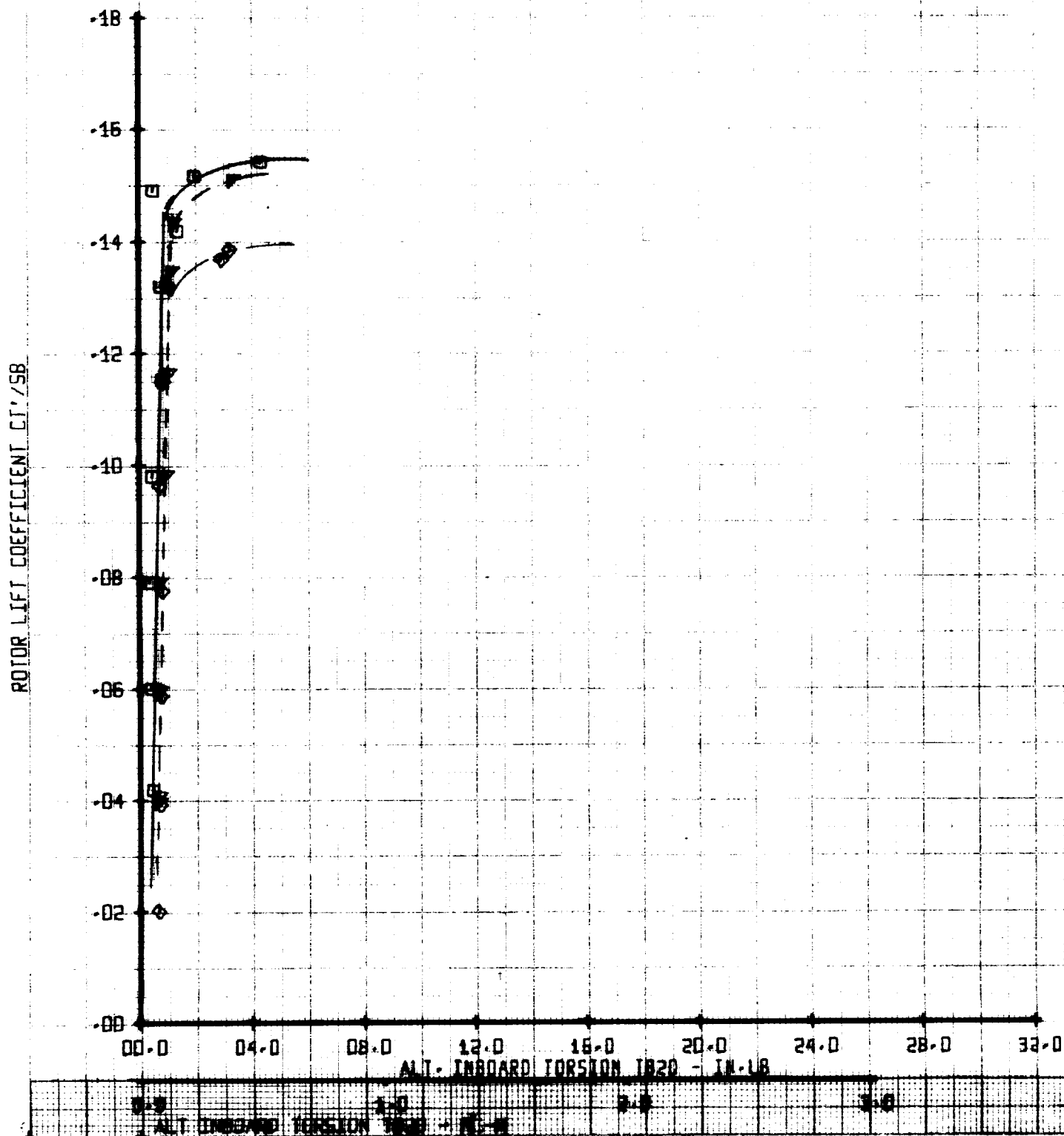


Figure A-13

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	VTUN
□	22	0	-	0
△	23	0	-	0
○	24	0	-	0

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB51

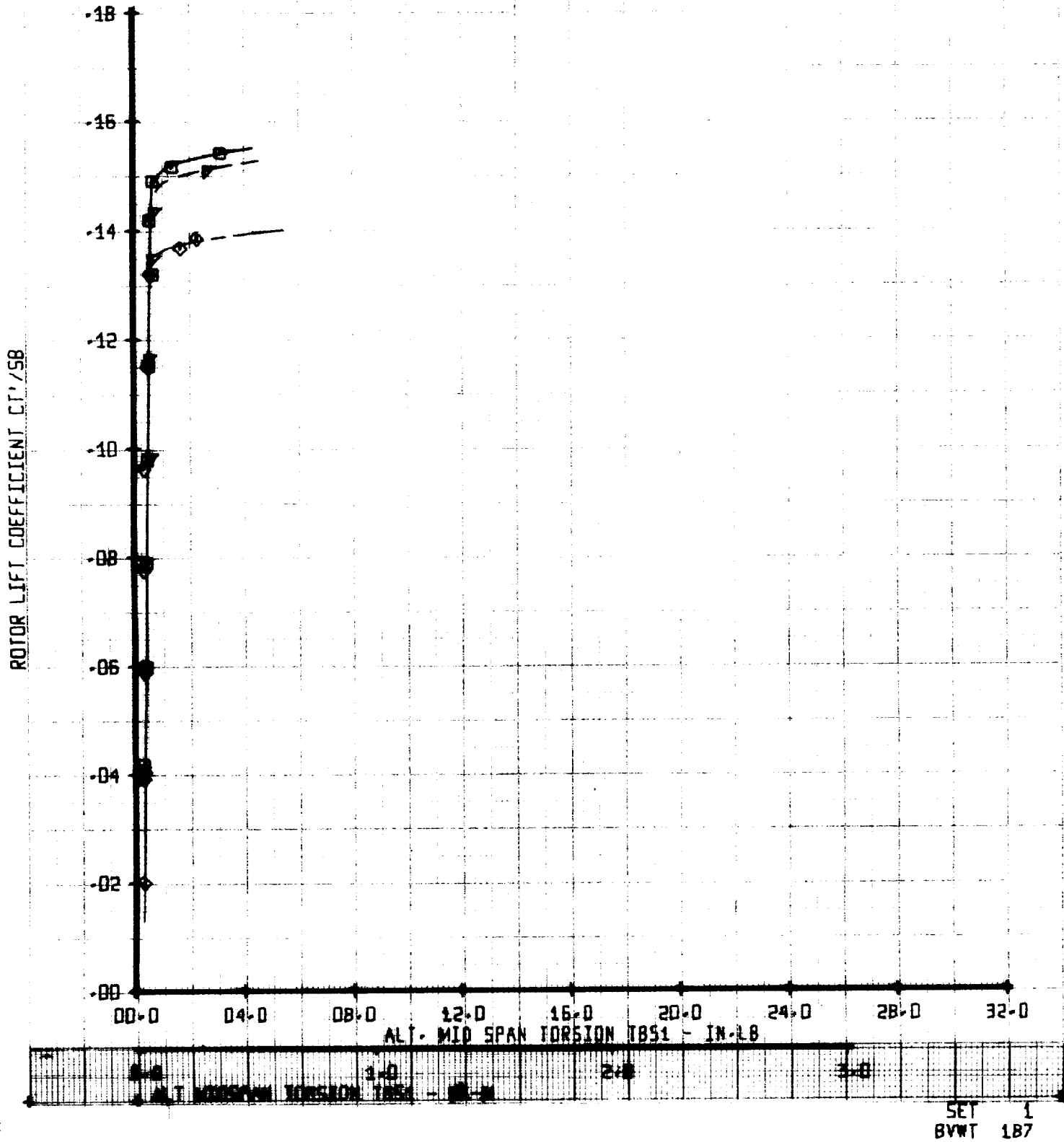


Figure A-14

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

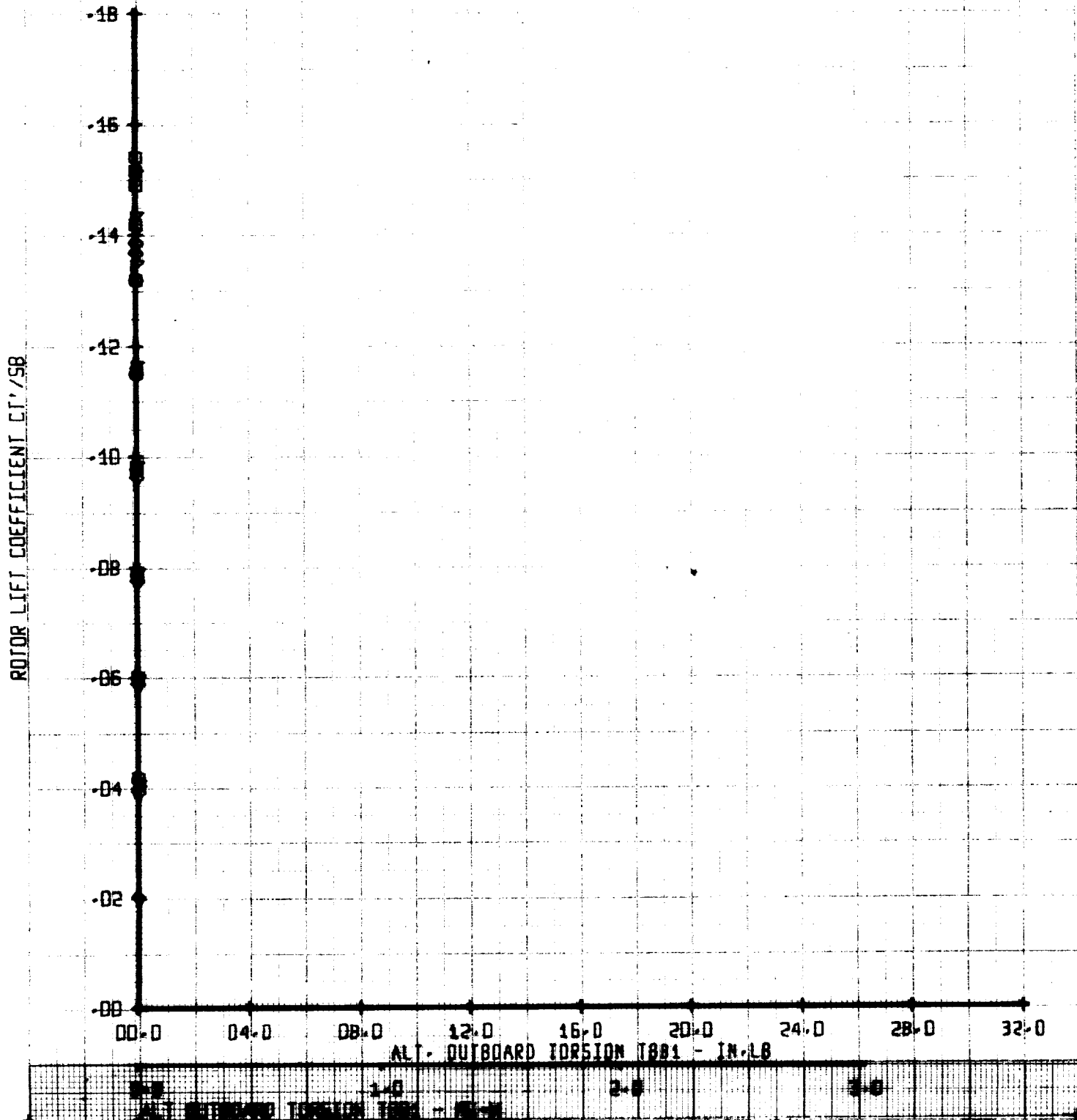
LIFT LIMIT TESTING

SYM
0
1
2RUN
22
23
24

LEGEND

MU
0
0
0X/00258
-
-
+VILIN
0
0
0

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB81



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	VTUN
□	22	0	-	0
△	23	0	-	0
◇	24	0	-	0

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

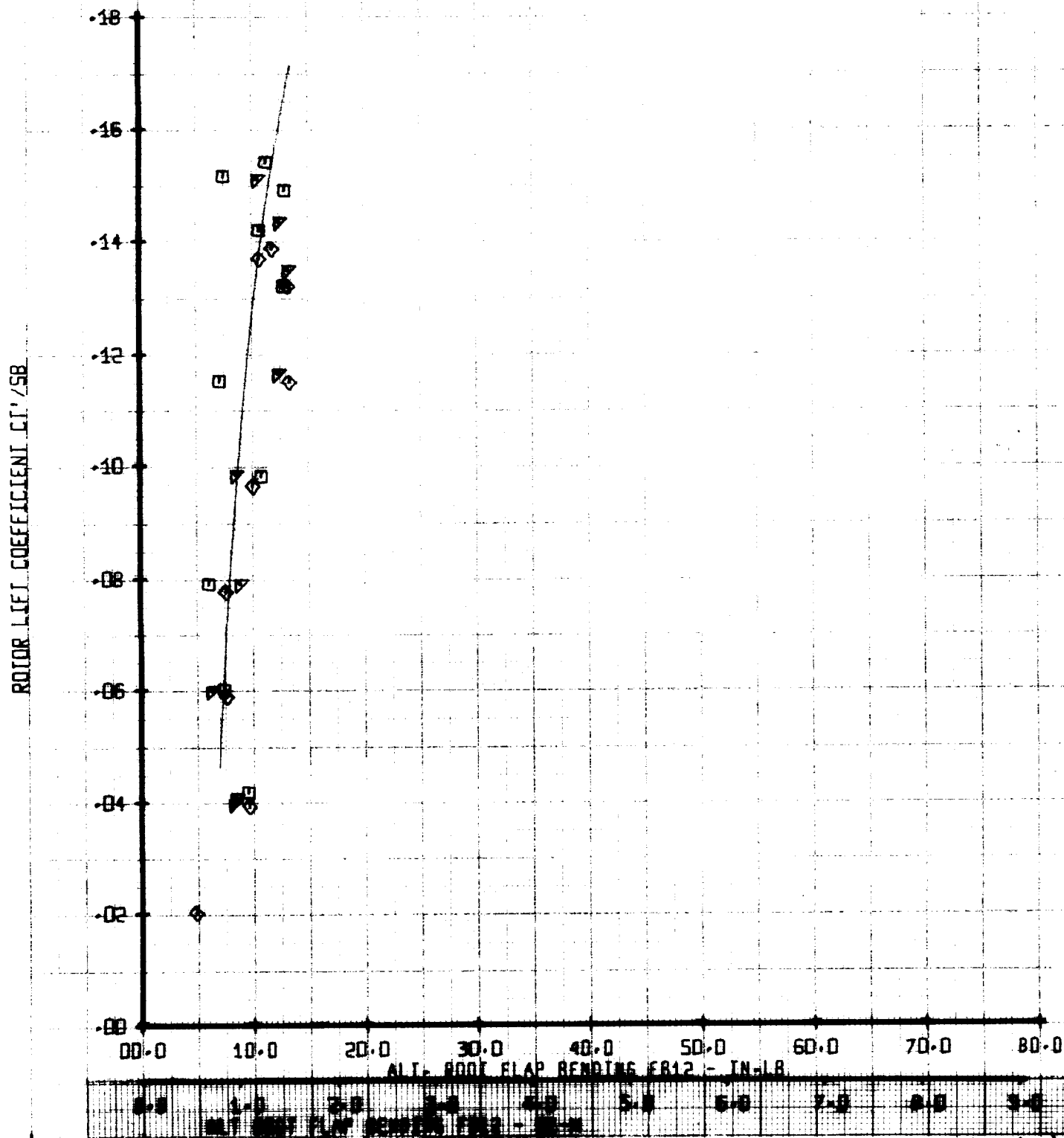


Figure A-16

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

SYM
0
1
2

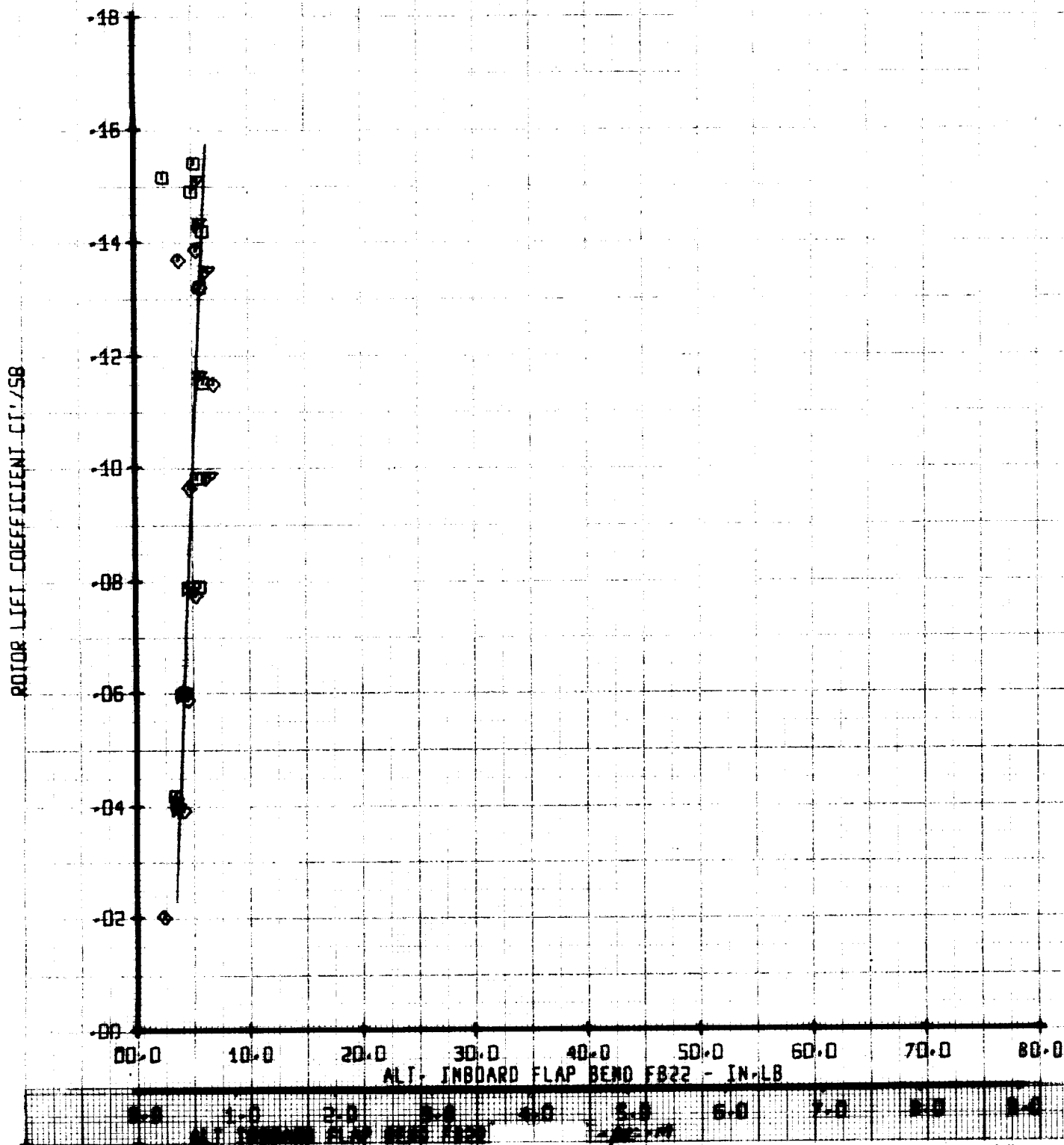
RUN
22
23
24

LEGEND

MU X/00258 VTUN
0 - 0
0 - 0
0 - 0

ROTOR LIFT COEFFICIENT
VERSUS

ALTERNATING INBOARD FLAP BENDING FB22



LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

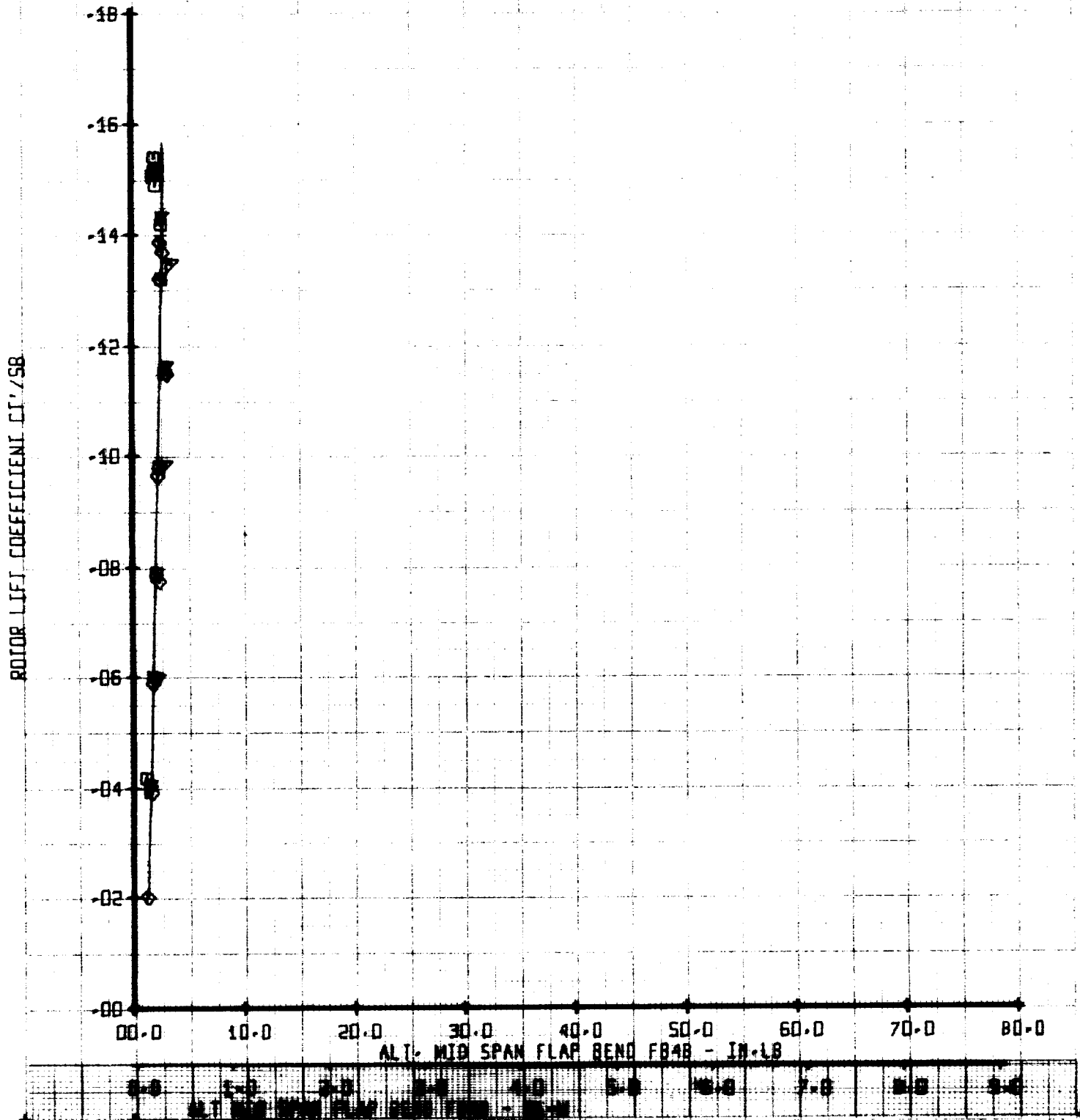
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DD258	VTUN
□	22	0	-	0
△	23	0	-	0
◇	24	0	-	0

 ROTOR LIFT COEFFICIENT
 VERSUS

ALTERNATING MID SPAN FLAP BENDING FB48



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/0025B	VTUN
□	22	0	-	0
▽	23	0	-	0
◇	24	0	-	0

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

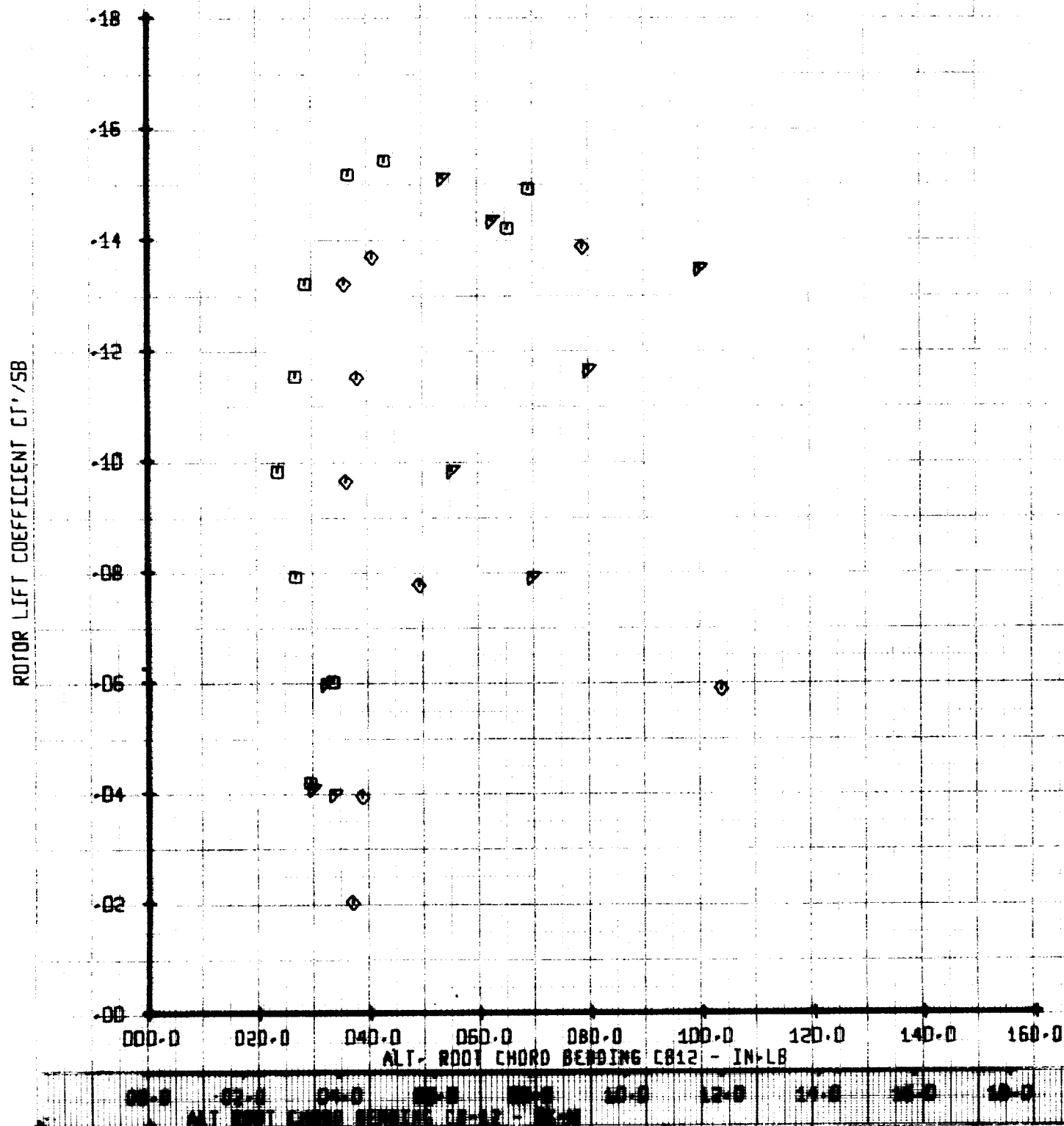


Figure A-19

LIFT-PROPULSIVE FORCE LIMIT TEST

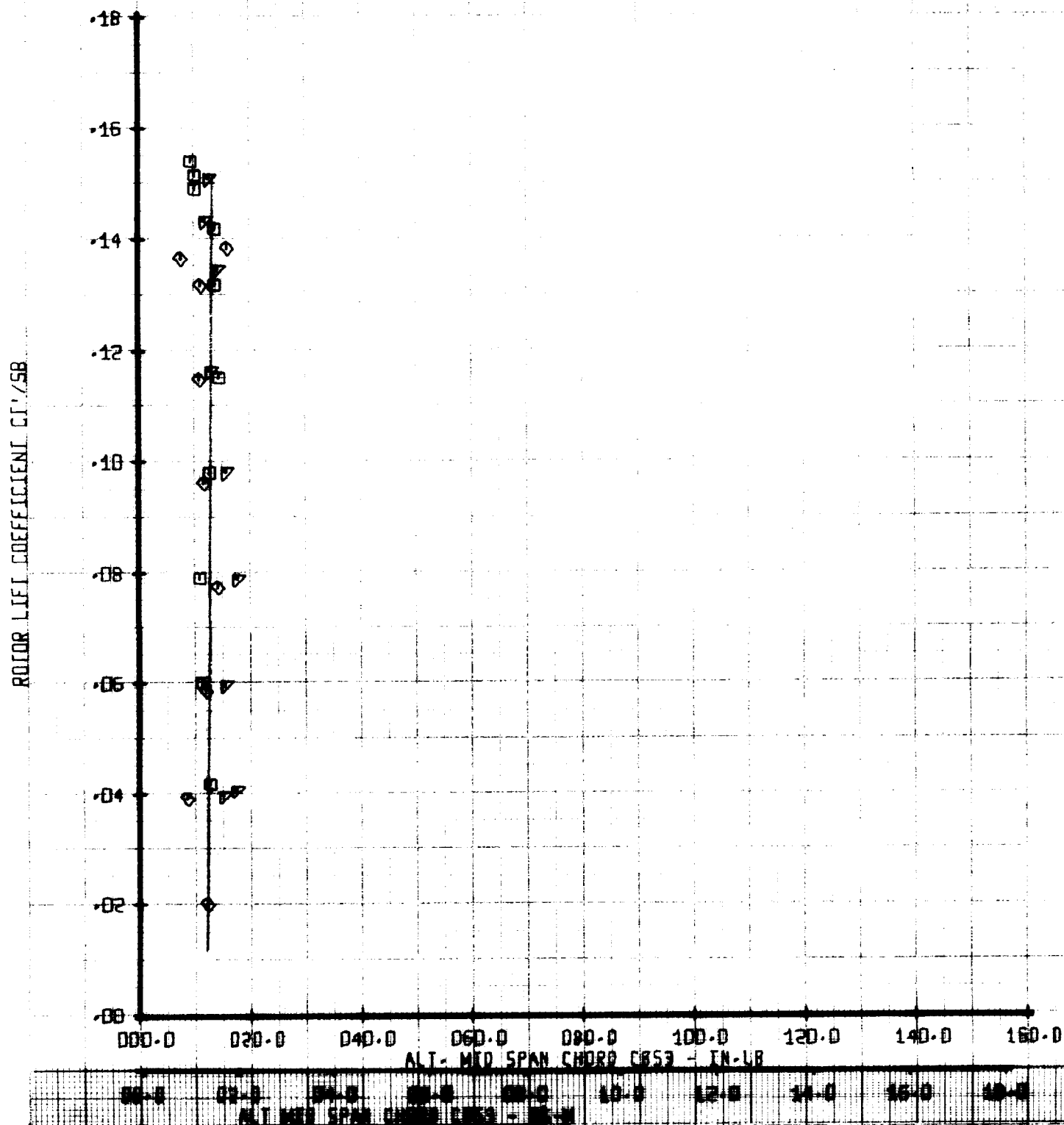
1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/DD2SB	VTUN
□	22	0	-	0
△	23	0	-	0
◇	24	0	-	0

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN CHORD CB53



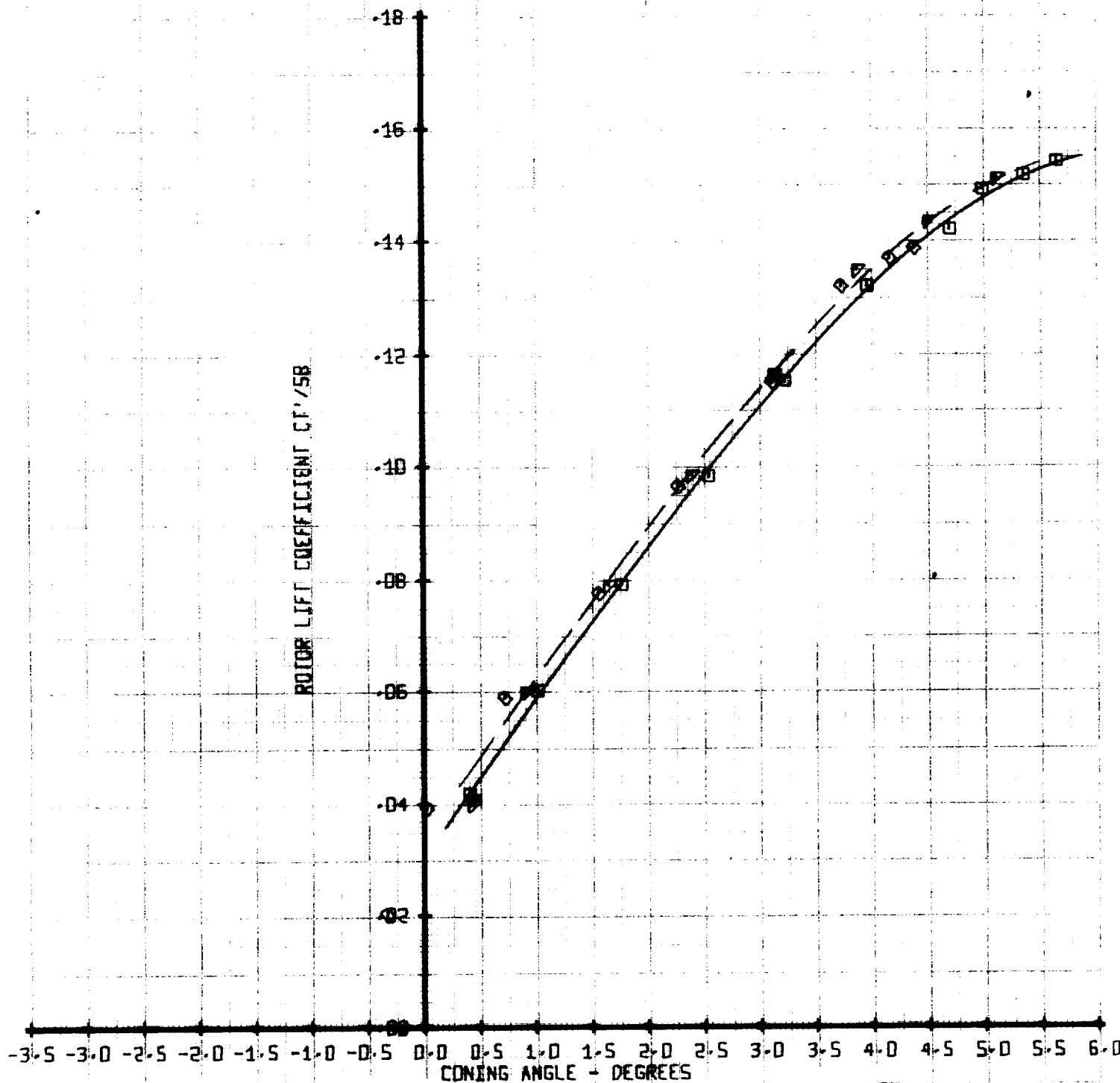
LIFT-PROPULSIVE FORCE LIMIT TEST

1/40 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/D025B	VTUN
□	22	0	-	0
△	23	0	-	0
◇	24	0	-	0

 ROTOR LIFT COEFFICIENT
 VERSUS
 CONING ANGLE


LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

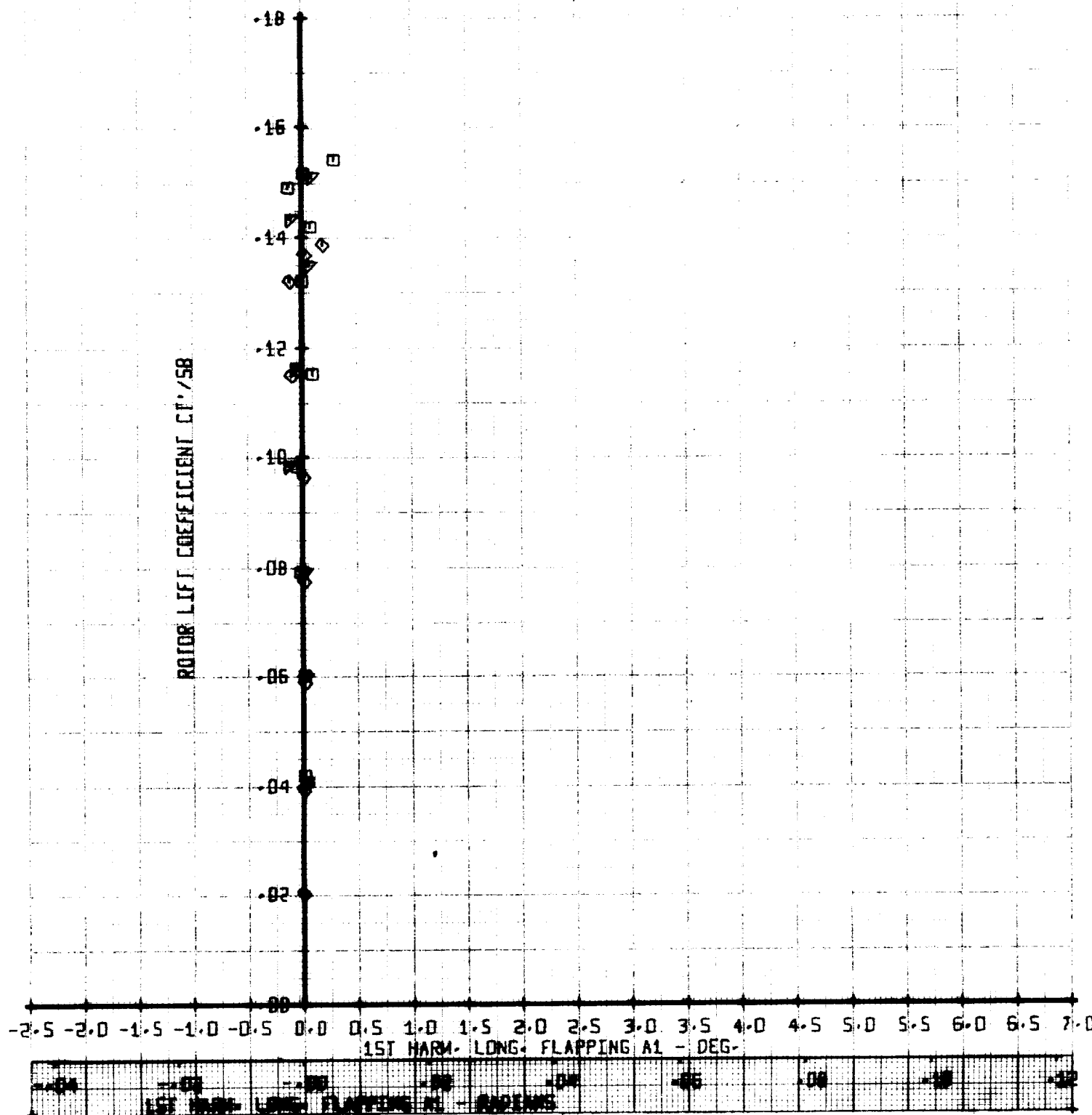
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/QD2SB	YIUN
□	22	0	-	0
▽	23	0	-	0
◇	24	0	-	0

ROTOR LIFT COEFFICIENT
VERSUS

1ST HARMONIC LONGITUDINAL FLAPPING A1

SET 1
BVWT 187

LIFT-PROPULSIVE FORCE LIMIT TEST

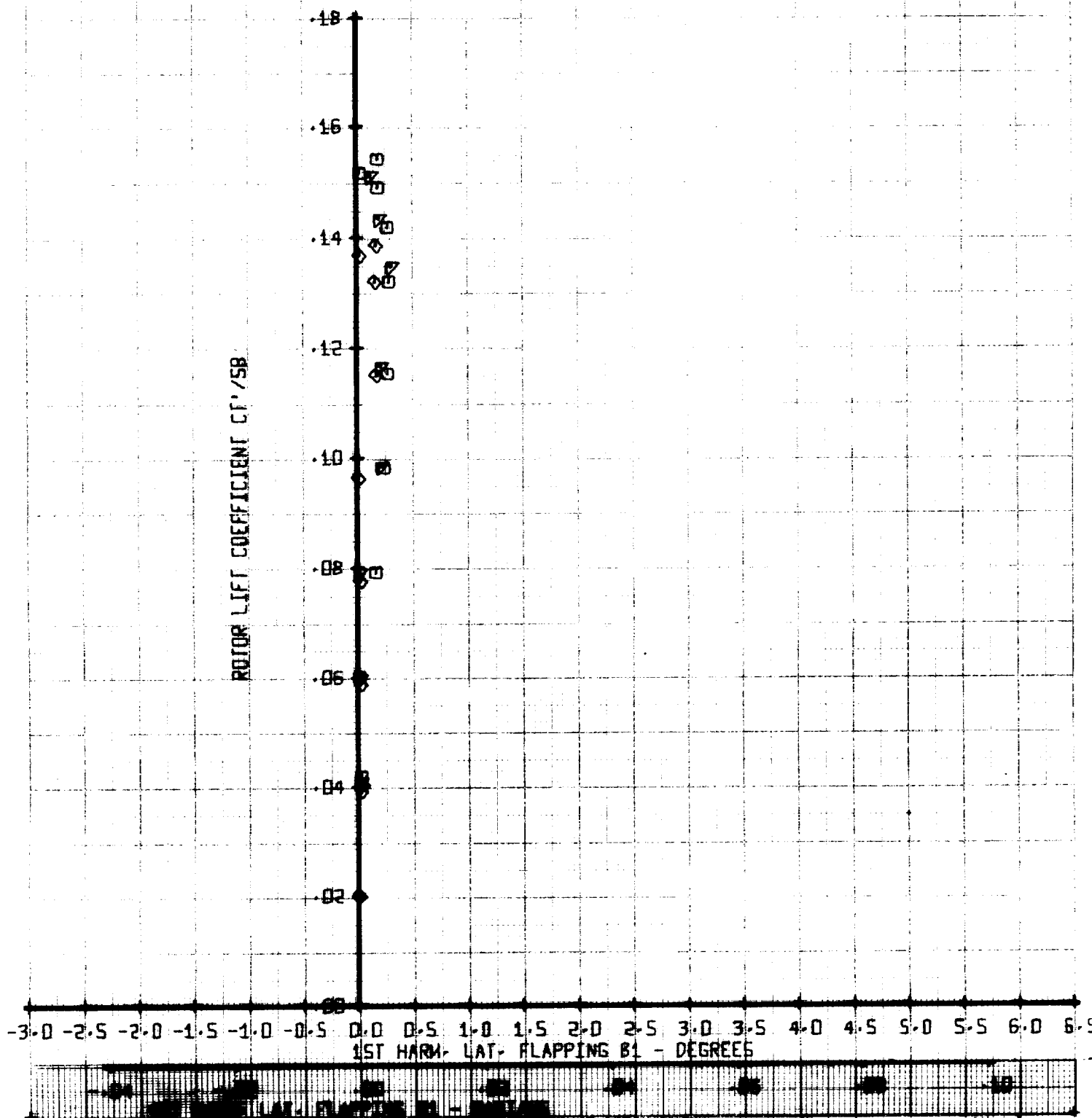
1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/QD25B	VTUN
□	22	0	-	0
◇	23	0	-	0
○	24	0	-	0

ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1



LIFT-PROPULSIVE FORCE LIMIT TEST

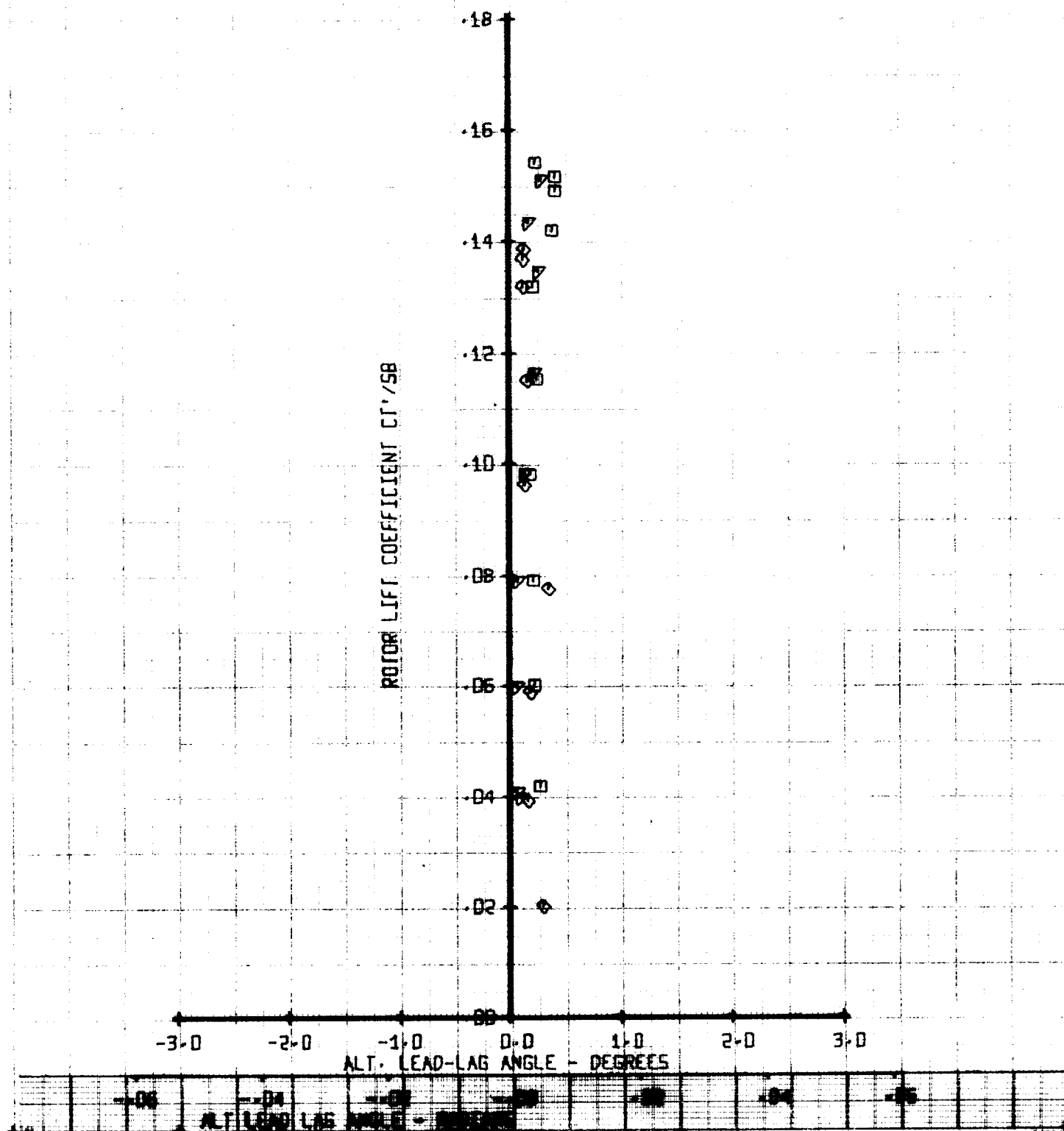
1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/QD258	VTUN
□	22	0	-	0
▽	23	0	-	0
◇	24	0	-	0

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU'	X/00258	VTUN
□	22	0	-	0
△	23	0	-	0
◇	24	0	-	0

ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1

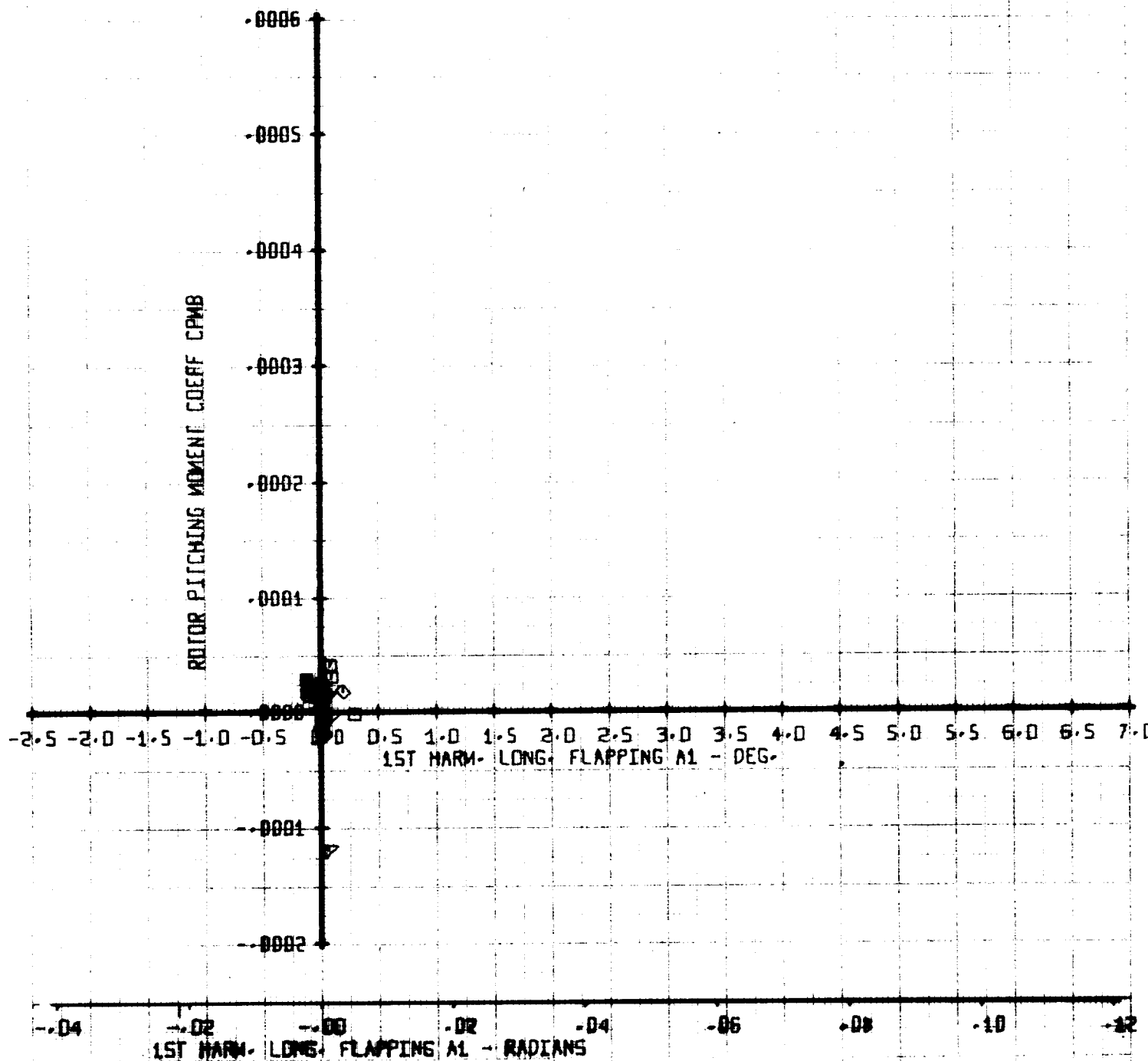


Figure A-25

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/0025B	VTUN
□	22	0	1	0
△	23	0	1	0
◇	24	0	1	0

ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

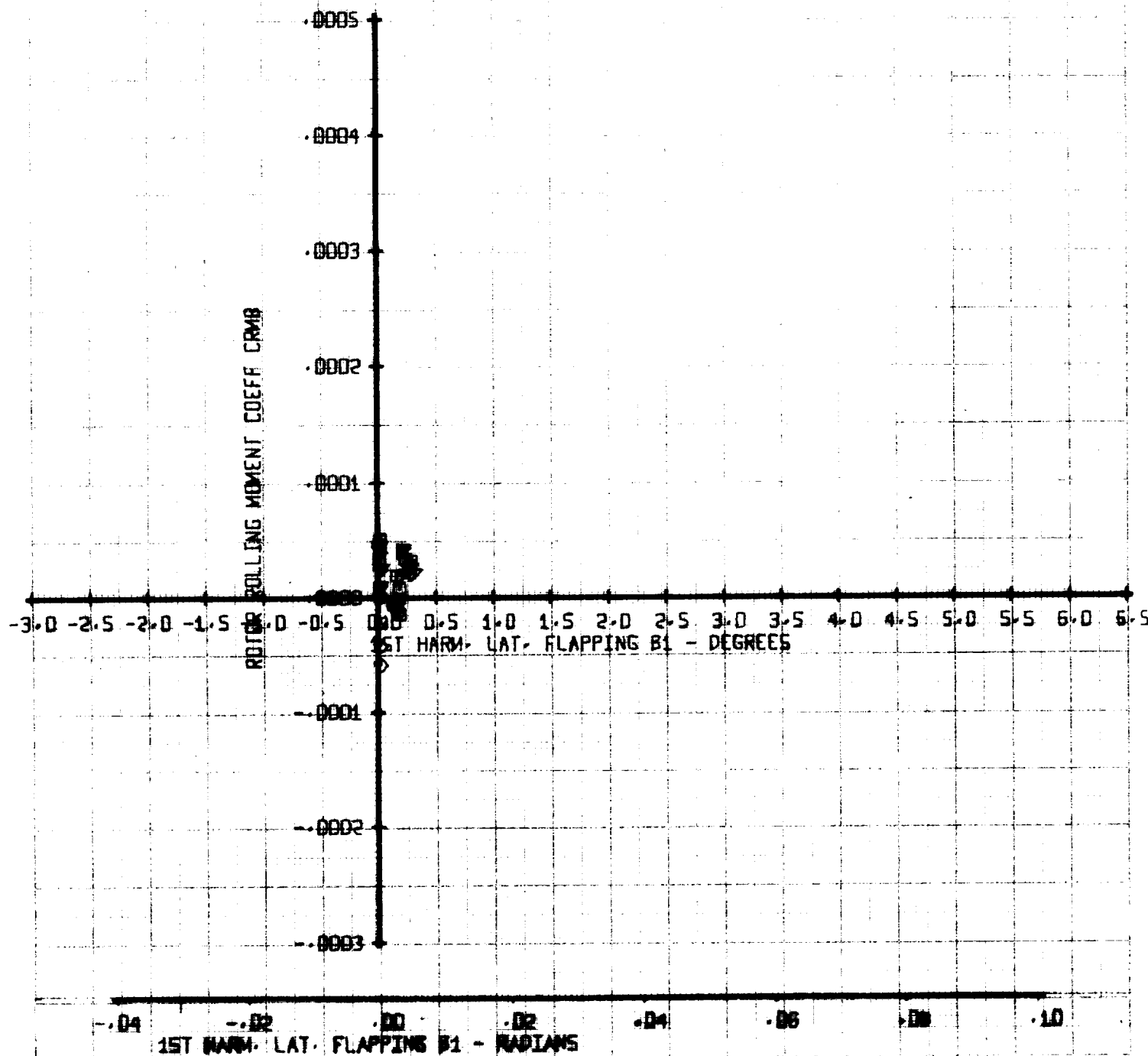


Figure A-26

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTUN
▲	25	.10	.05	62
▲	27	.20	.05	124
▲	28	.20	.05	124
▲	29	.30	.05	186
▲	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PROPULSIVE FORCE COEFFICIENT

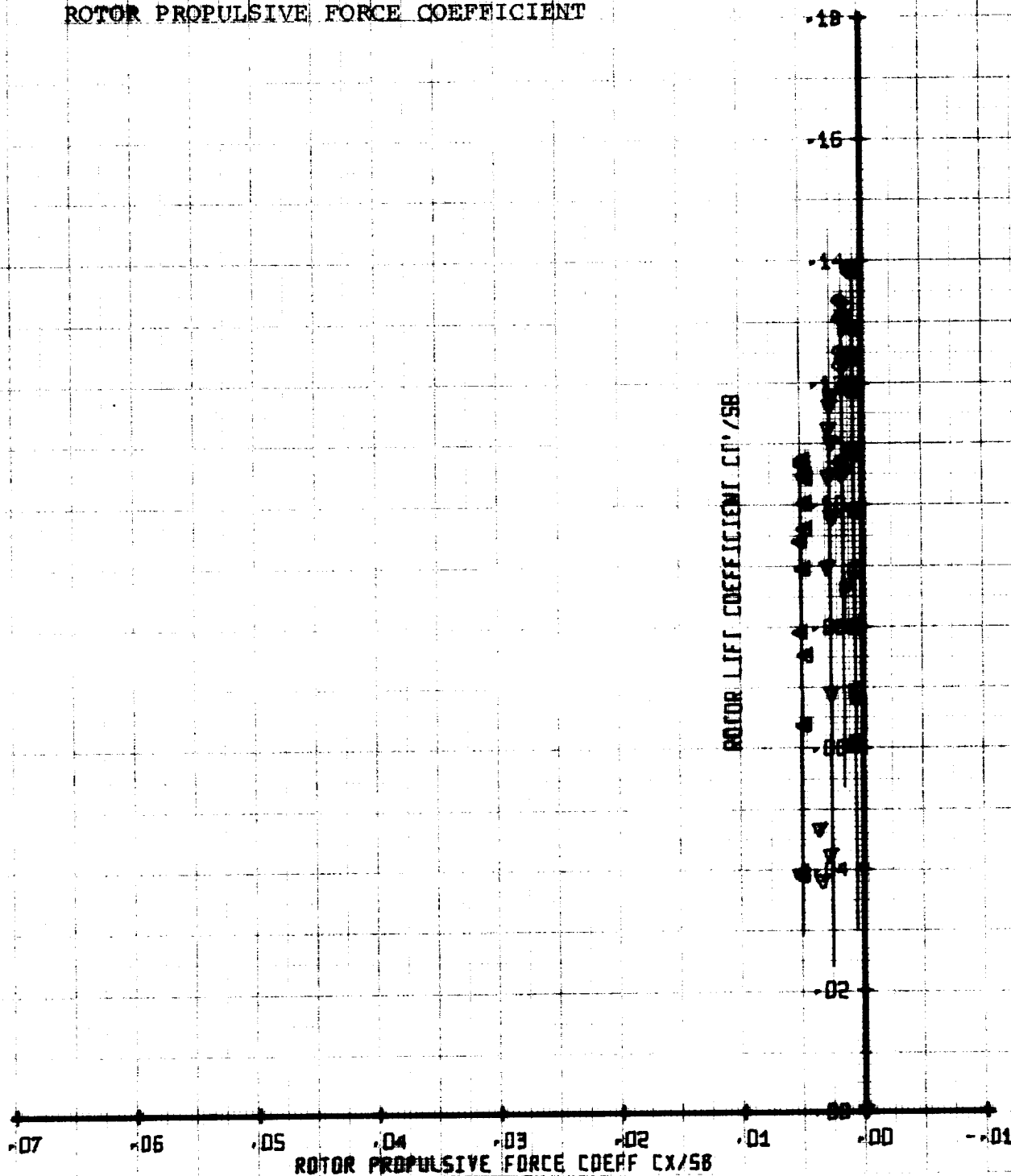


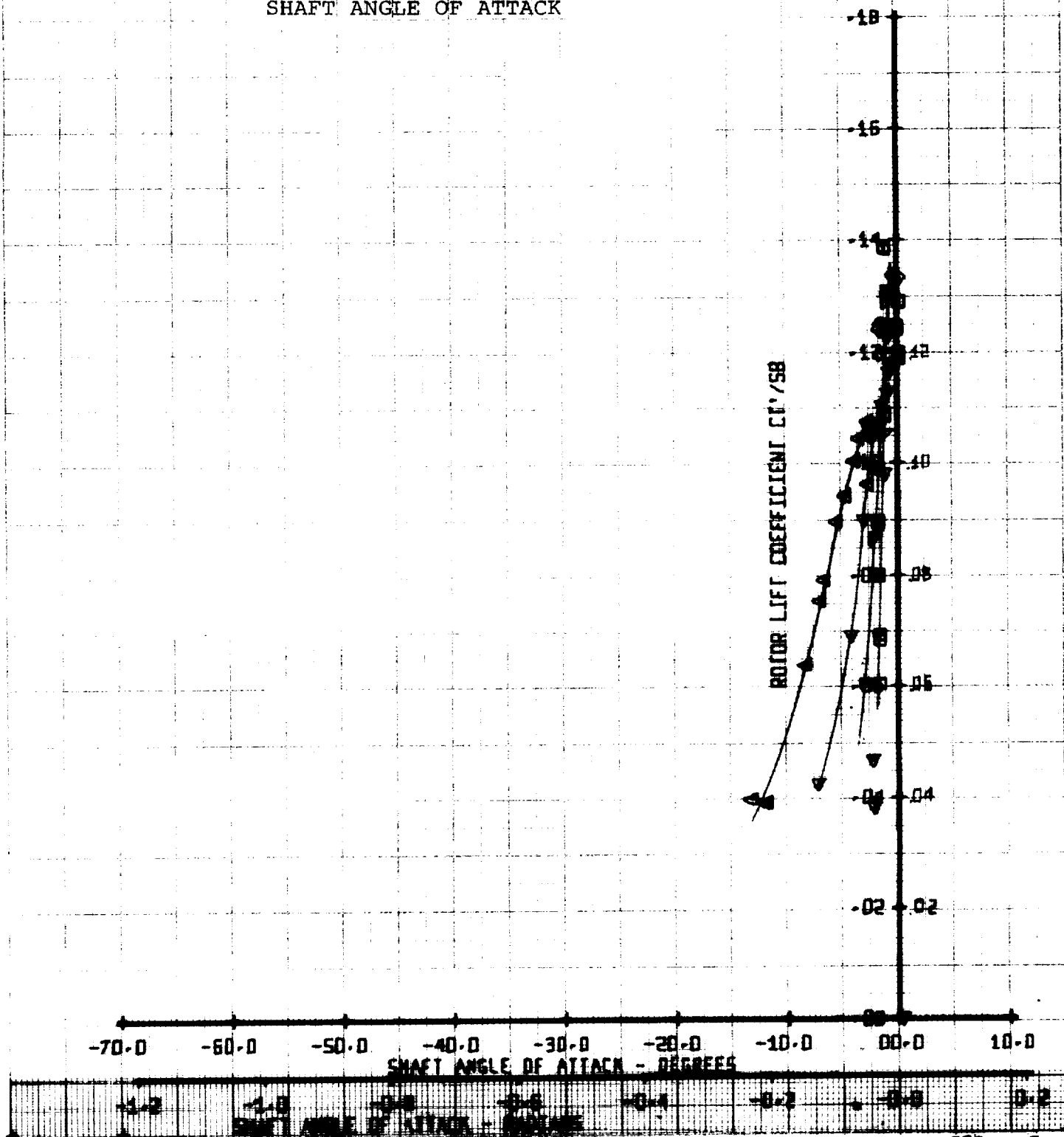
Figure A-27

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DO258	VTUN
▲	25	.10	.05	62
▼	27	.20	.05	124
◆	28	.20	.05	124
▲	29	.30	.05	186
▼	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK



SET 2
BVWT 187

Figure A-28

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'	X/DD258	VTUN
●	25	.10	.05	62
○	27	.20	.05	124
△	28	.20	.05	124
▽	29	.30	.05	186
◇	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH

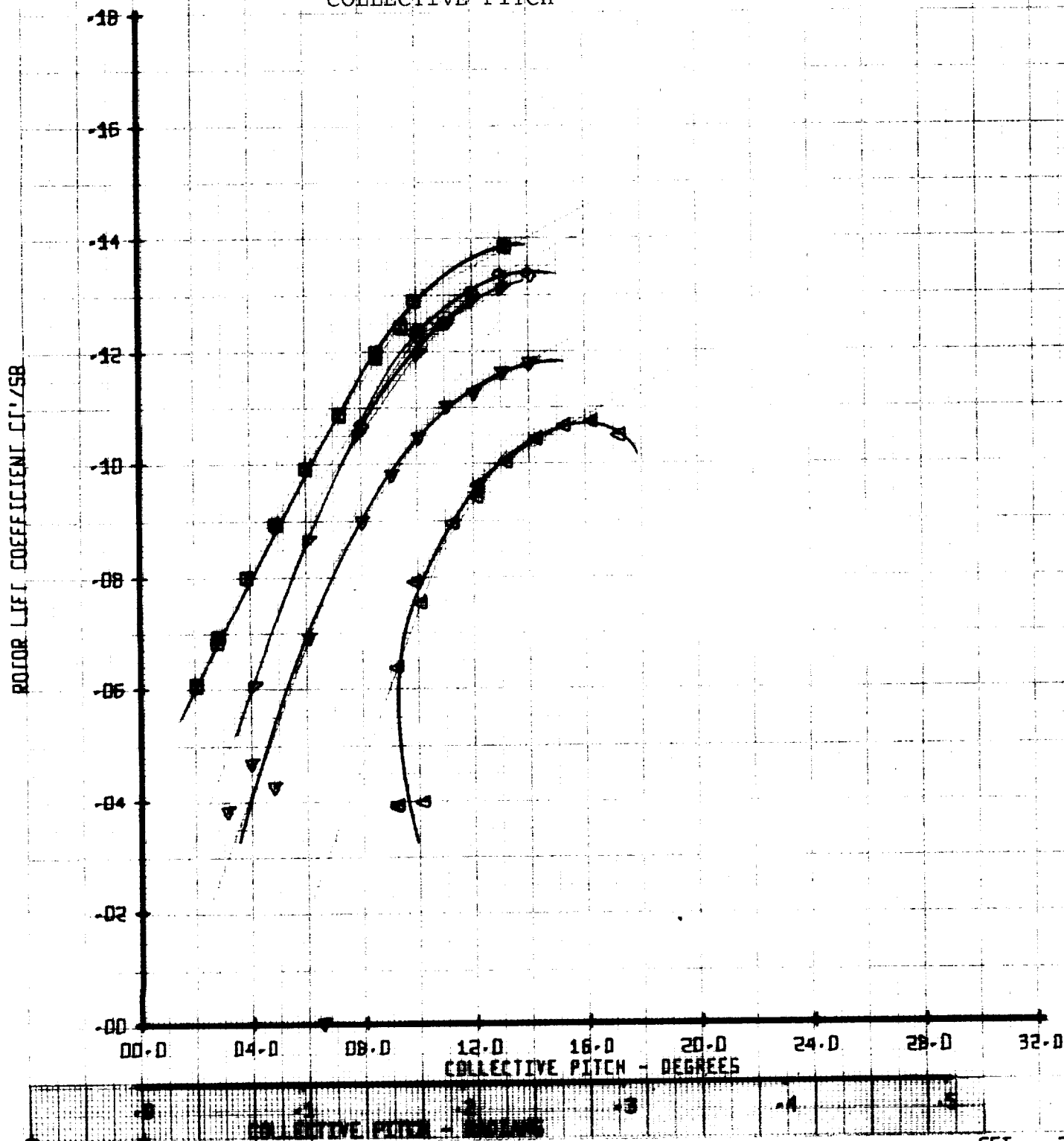


Figure A-29

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	YTUN
△	25	.10	.05	62
▽	27	.20	.05	124
◇	28	.20	.05	124
□	29	.30	.05	186
●	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
LONGITUDINAL CYCLIC

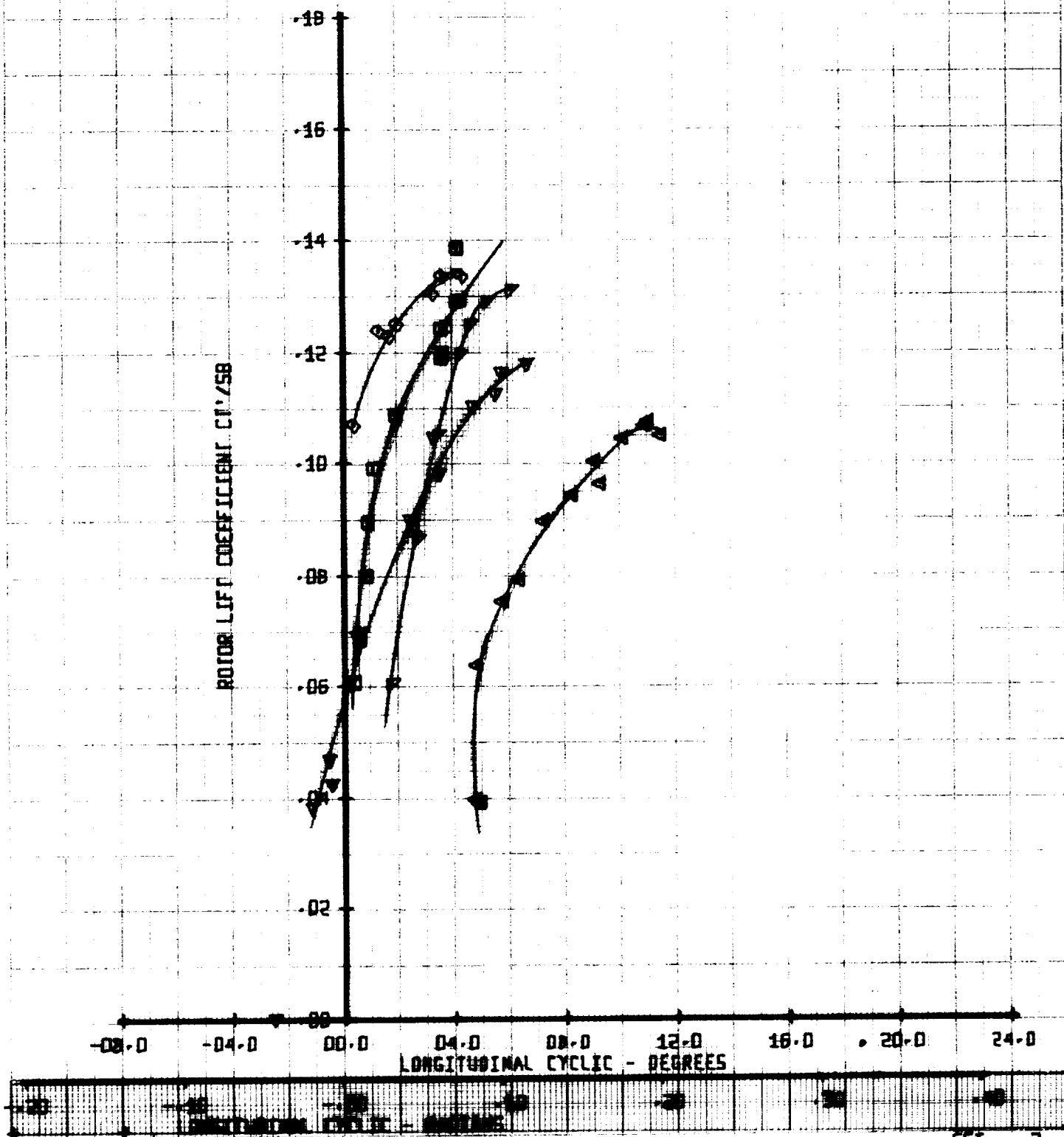


Figure A-30

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	M.I.	X/00258	VTUN
□	25	.10	.05	62
△	27	.20	.05	124
◇	28	.20	.05	124
▽	29	.30	.05	186
▲	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
LATERAL CYCLIC

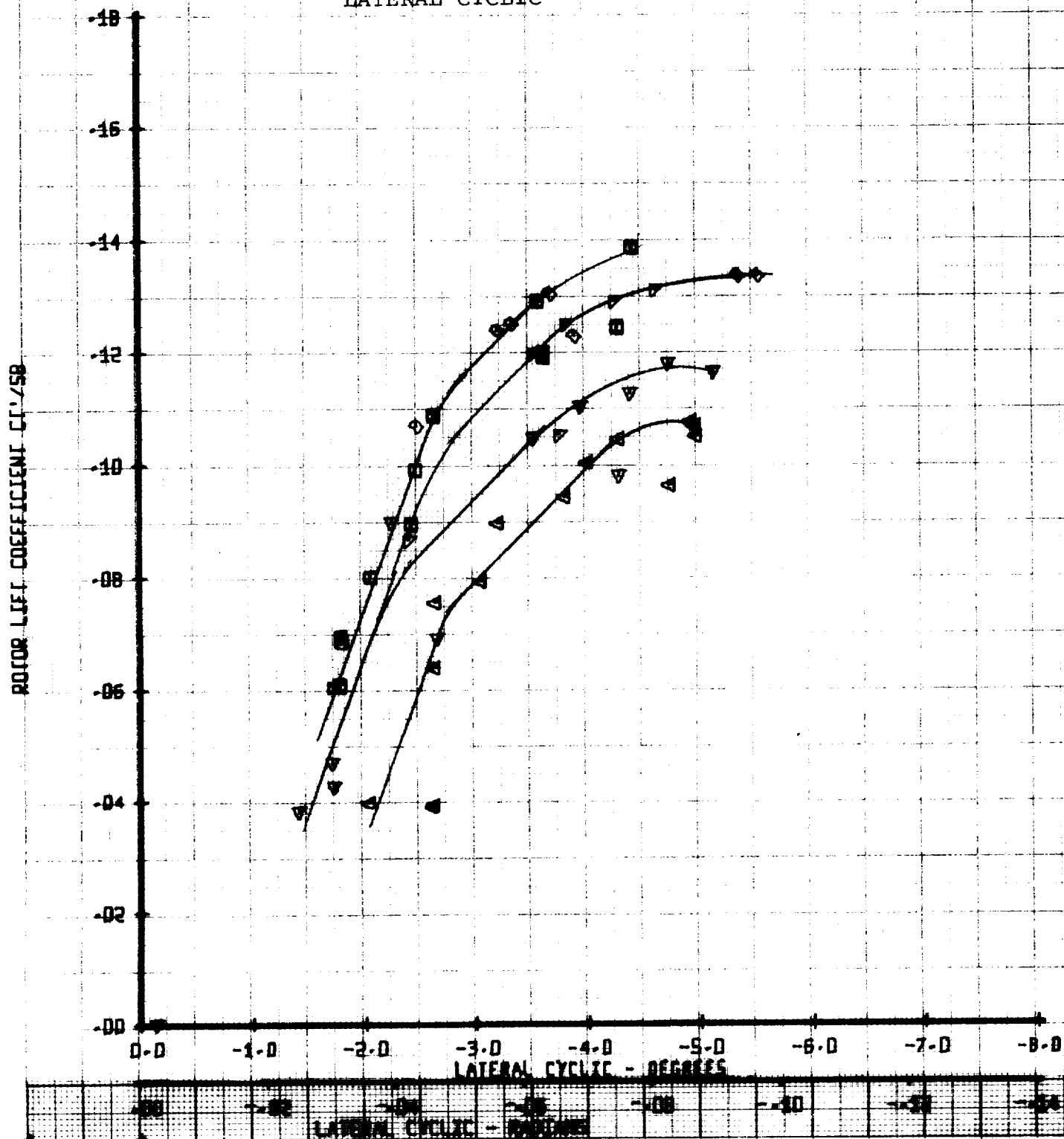


Figure A-31

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/DO258	VTUN
△	25	.10	.05	62
▽	27	.20	.05	124
○	28	.20	.05	124
□	29	.30	.05	186
◇	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT

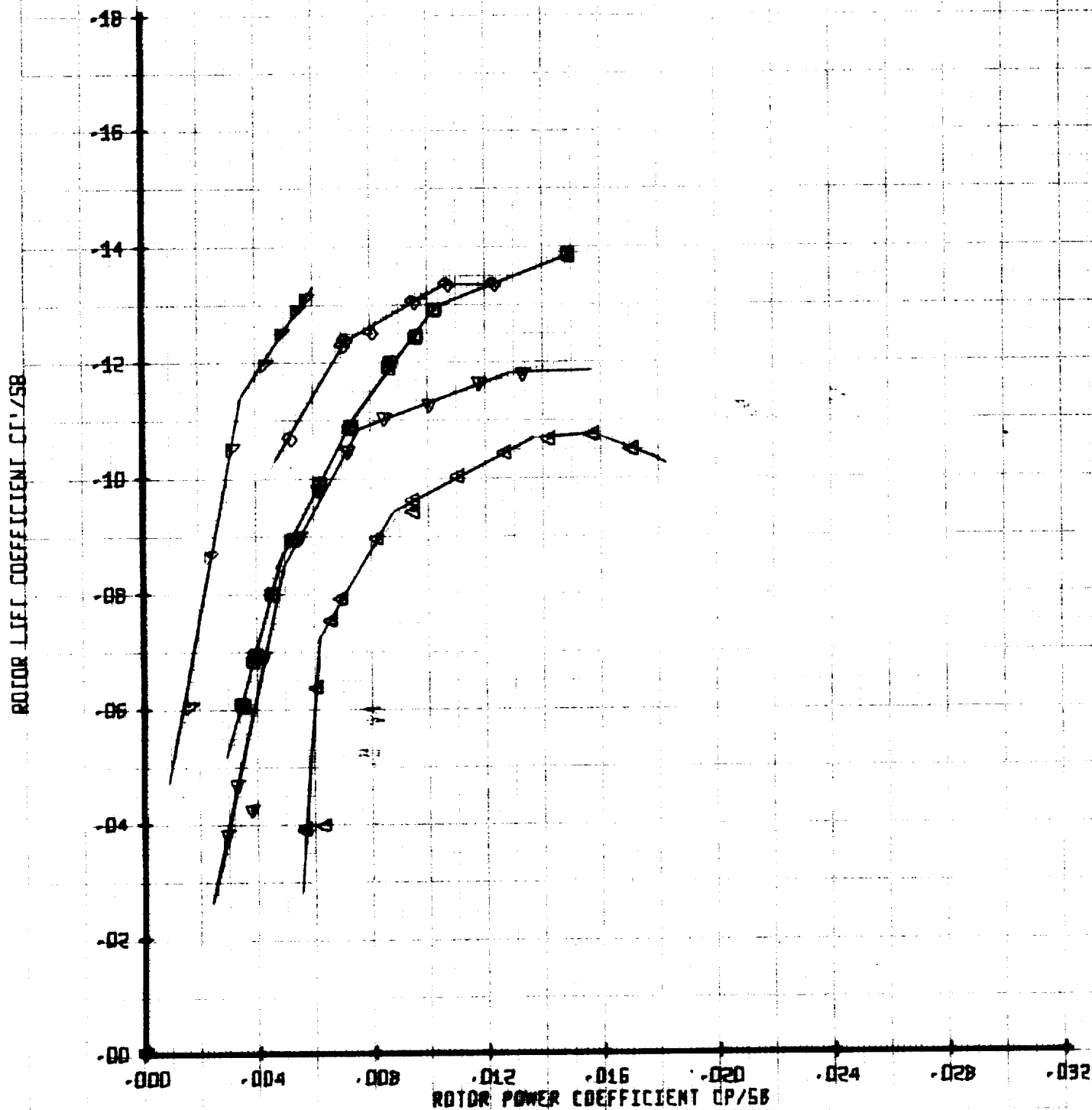


Figure A-32

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MY	X/CD258	VTUN
□	25	.10	.05	62
▽	27	.20	.05	124
◇	28	.20	.05	124
△	29	.30	.05	186
◊	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT

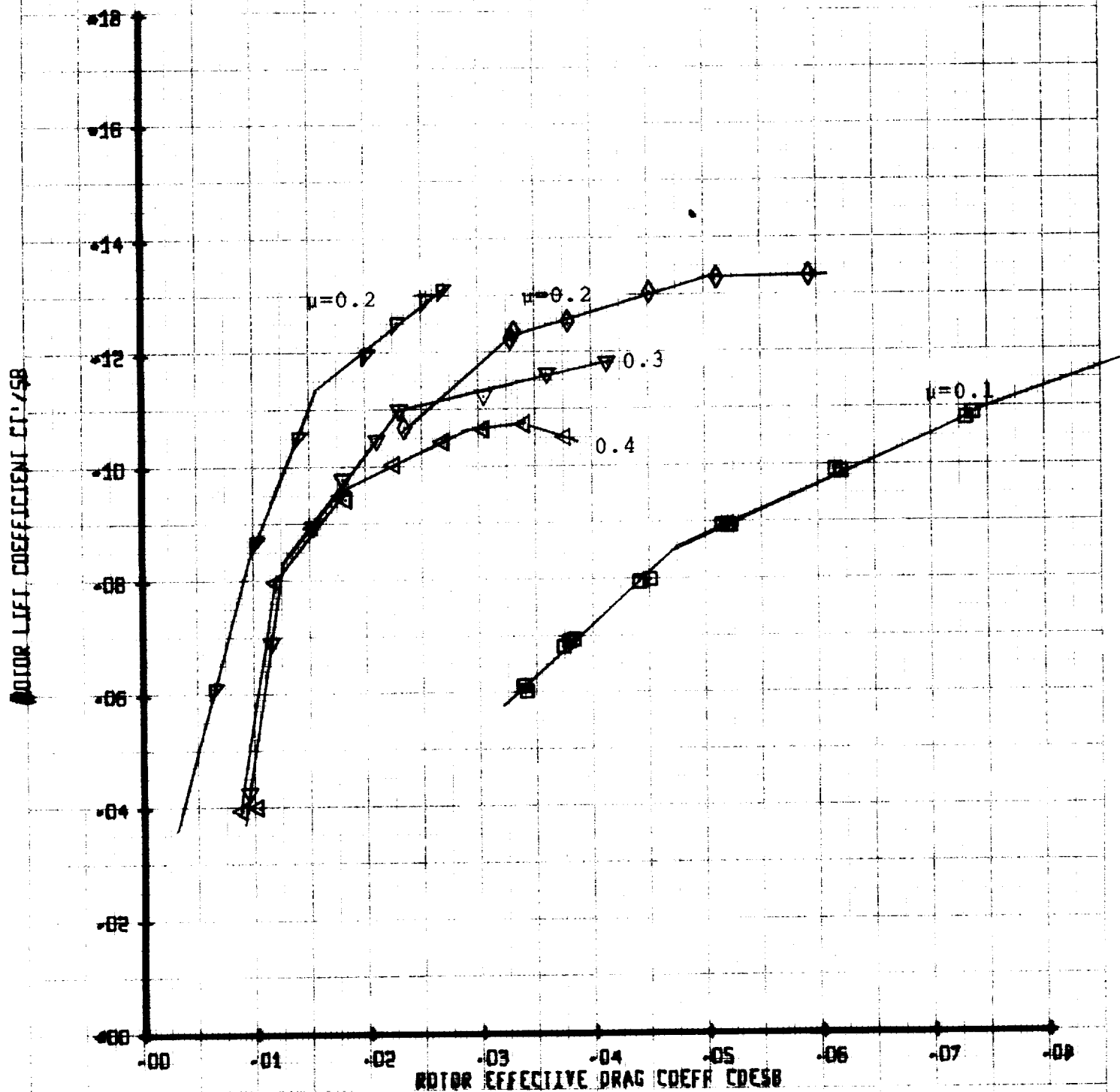


Figure A-33

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTUN
□	25	.10	.05	62
△	27	.20	.05	124
▽	28	.20	.05	124
◇	29	.30	.05	186
▲	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

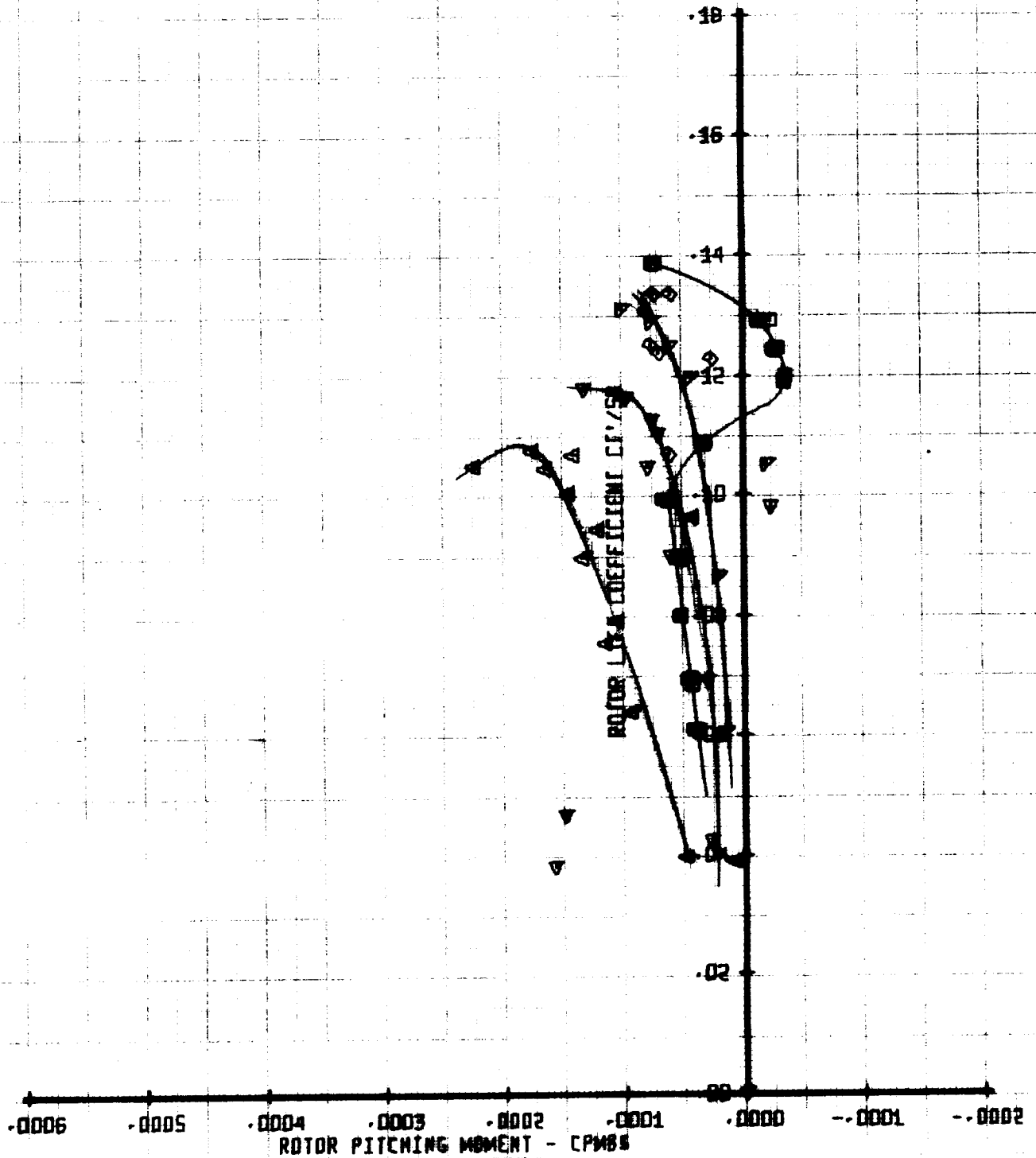


Figure A-34

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTUM
△	25	.10	.05	62
◇	27	.20	.05	124
□	28	.20	.05	124
▽	29	.30	.05	186
●	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT

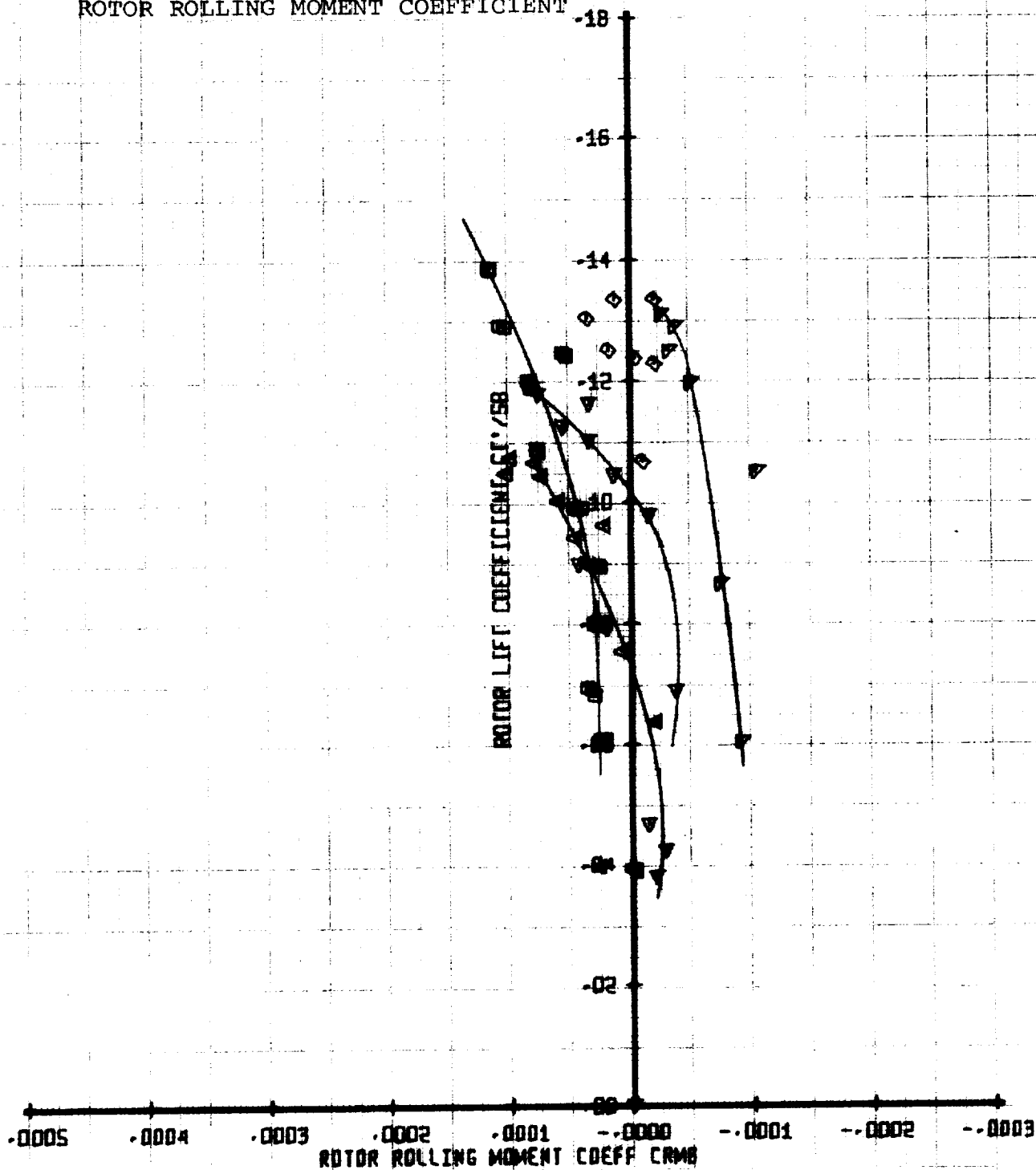


Figure A-35

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU'	X/00258	VTUN
□	25	.10	.05	62
△	27	.20	.05	124
◇	28	.30	.05	124
▽	29	.30	.05	186
▲	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT

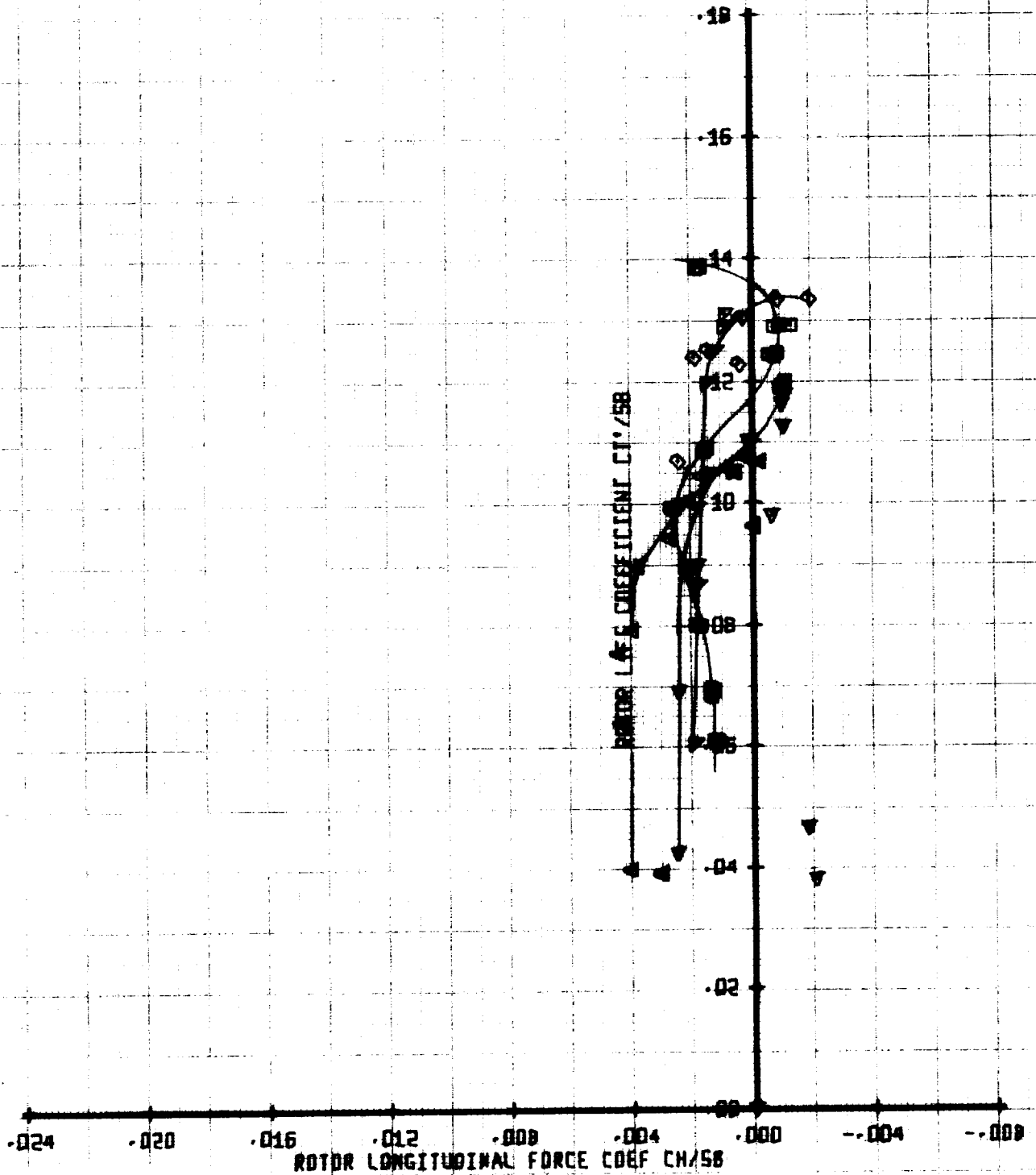


Figure A-36

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MI	X/00258	VTUN
▲	25	.10	.05	62
◆	27	.20	.05	124
◇	28	.30	.05	124
▼	29	.30	.05	186
△	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT

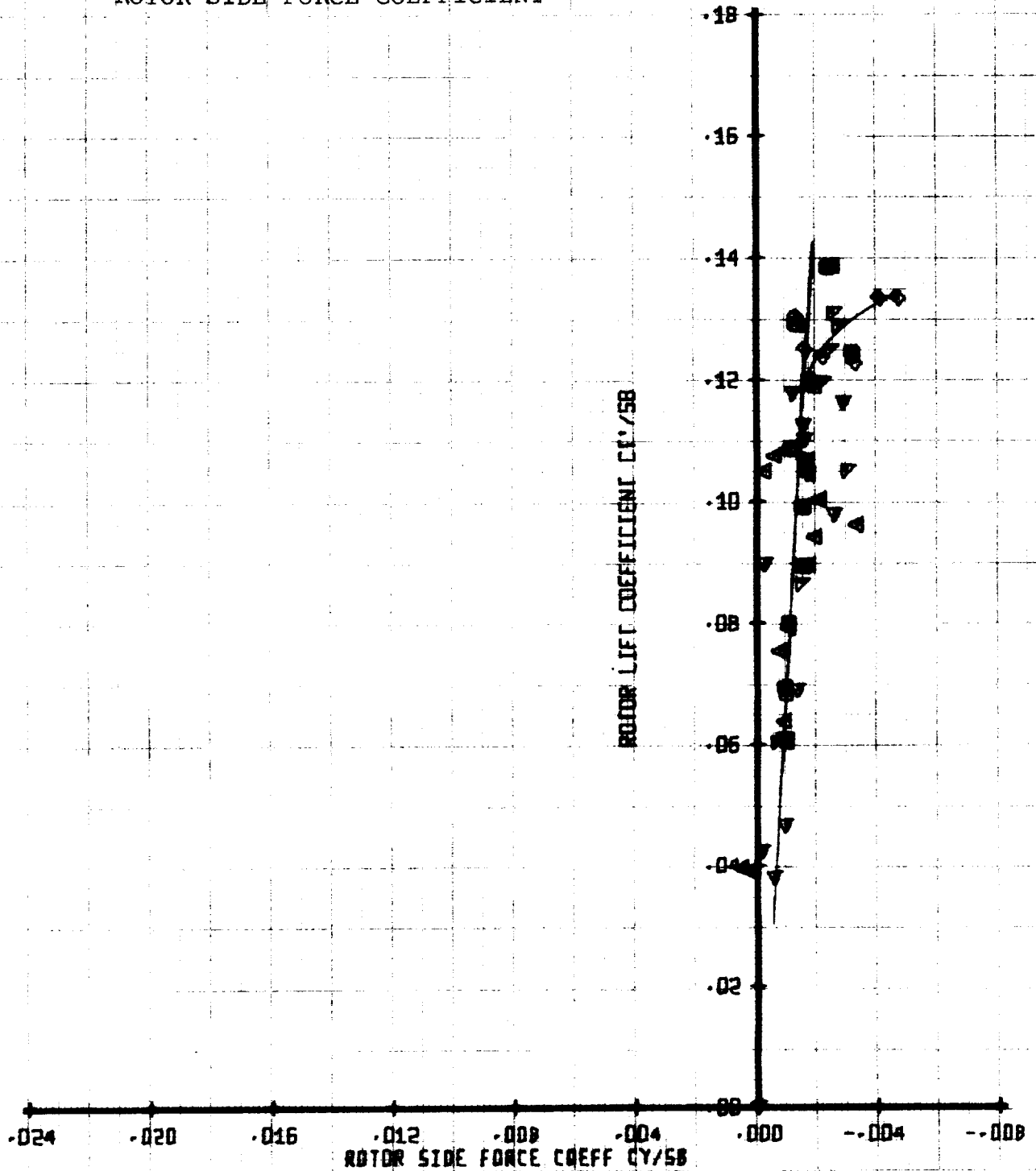


Figure A-37

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU*	X/DOZSB	VTUN
▲	25	.10	.05	82
◆	27	.20	.05	124
△	28	.20	.05	124
▼	29	.30	.05	186
◇	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

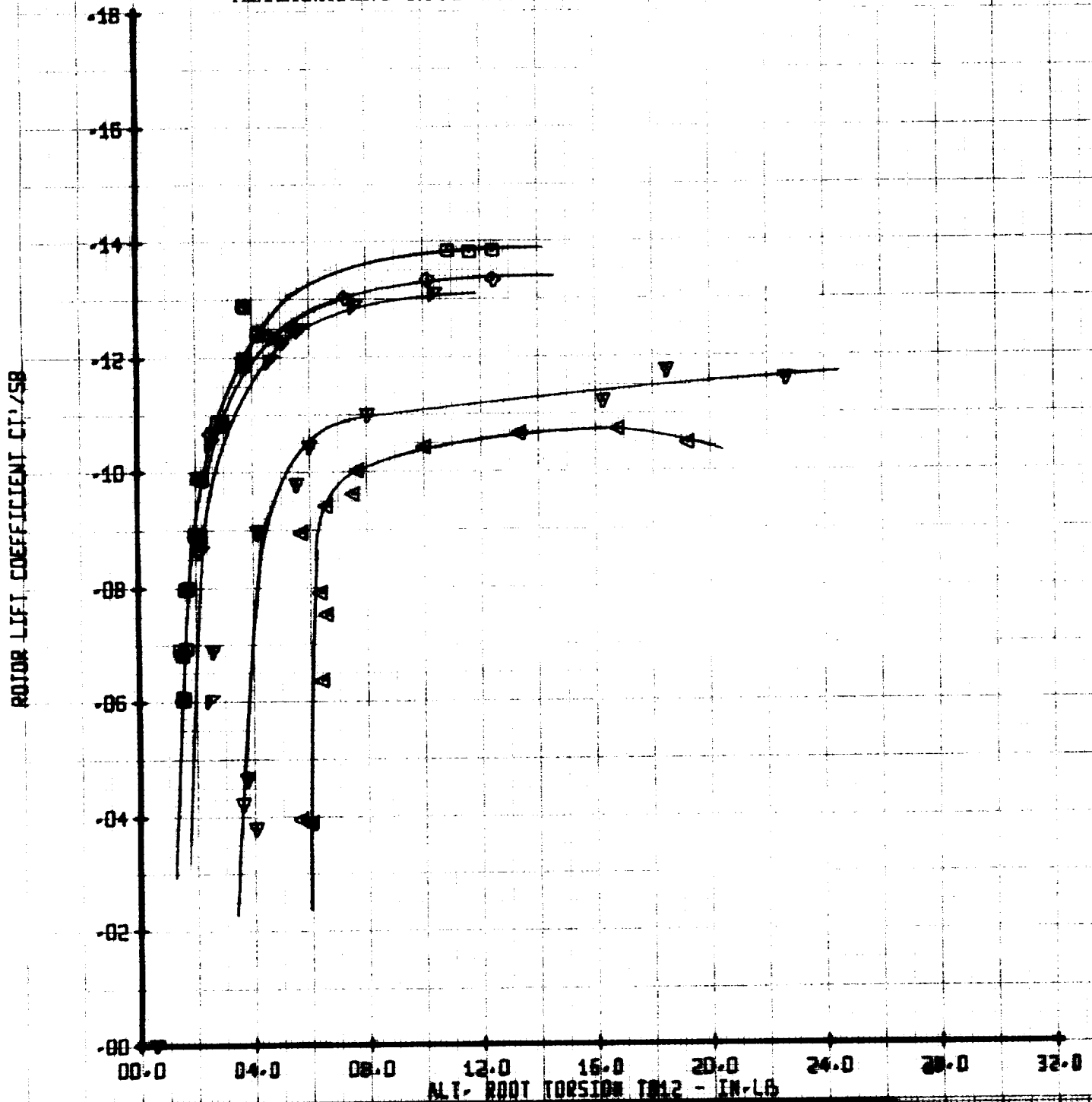
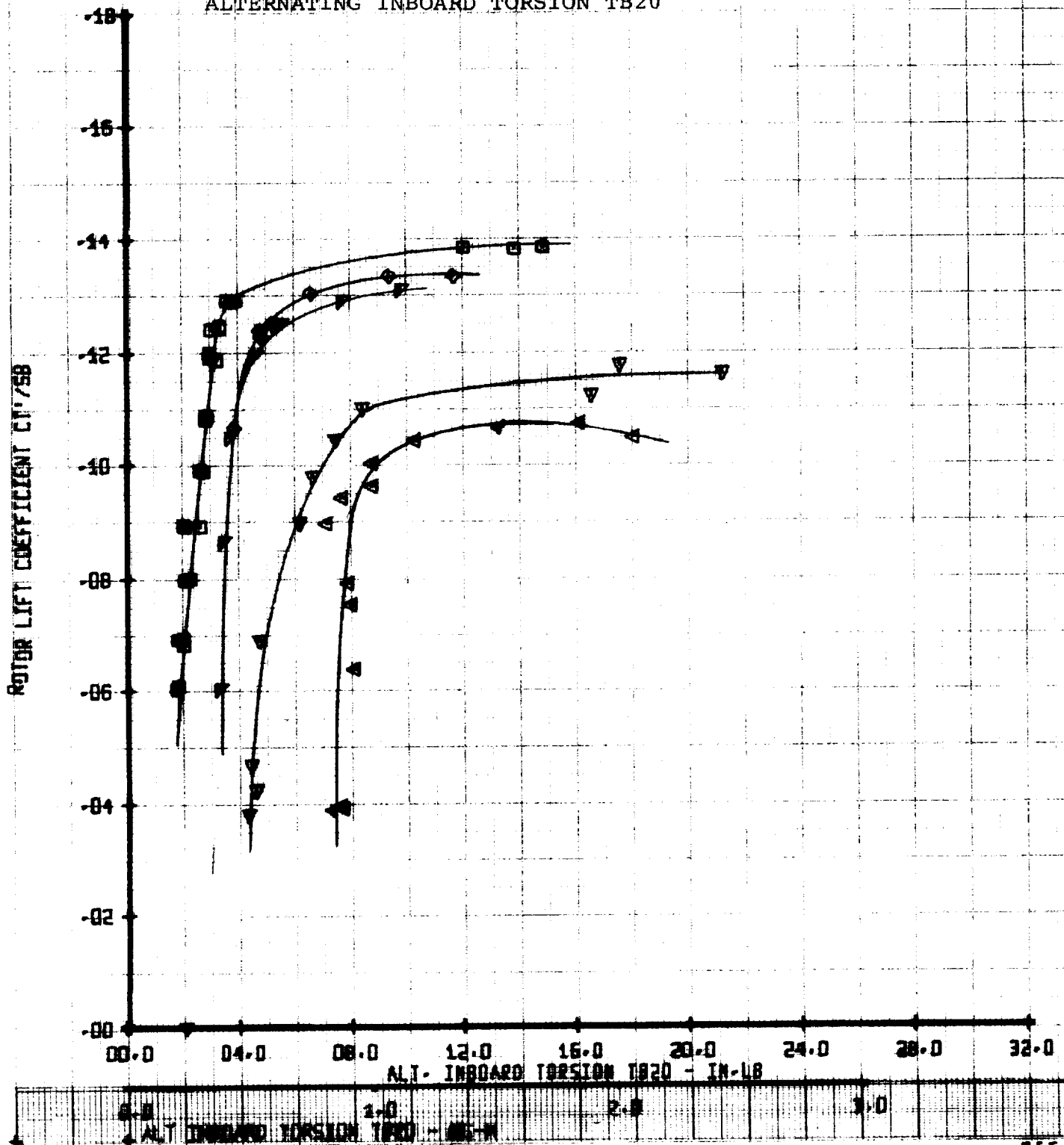


Figure A-38

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/DD258	VTUN
□	25	.10	.05	62
△	27	.20	.05	124
◇	28	.20	.05	124
▽	29	.30	.05	186
▲	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING INBOARD TORSION TB20



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	VTUN
□	25	.10	.05	62
▽	27	.20	.05	124
◇	28	.28	.05	124
△	29	.30	.05	186
△	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB51

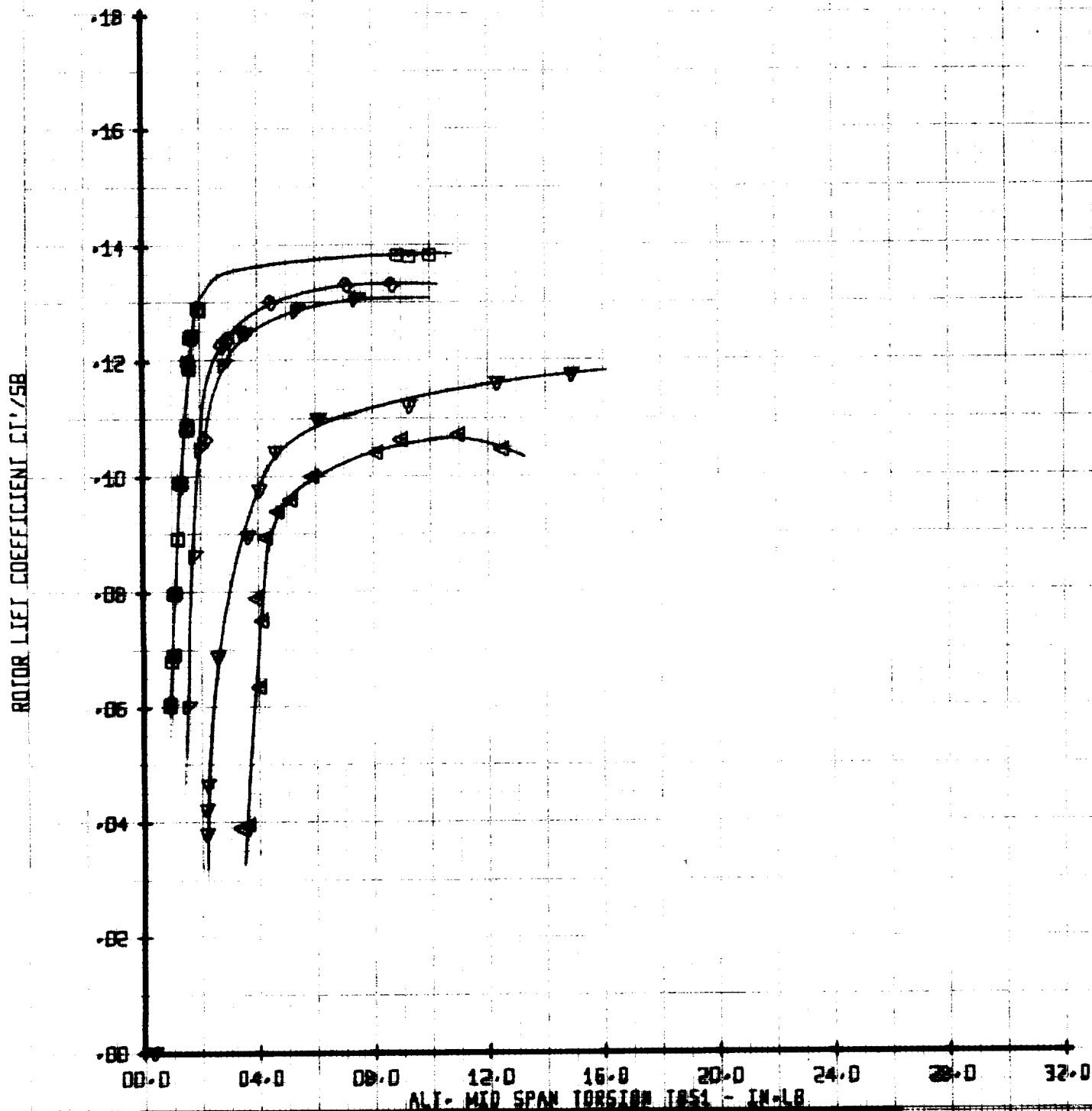


Figure A-40

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	NTUN
□	25	.10	.05	62
△	27	.20	.05	124
▽	28	.28	.05	124
▲	29	.30	.05	186
◆	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB81

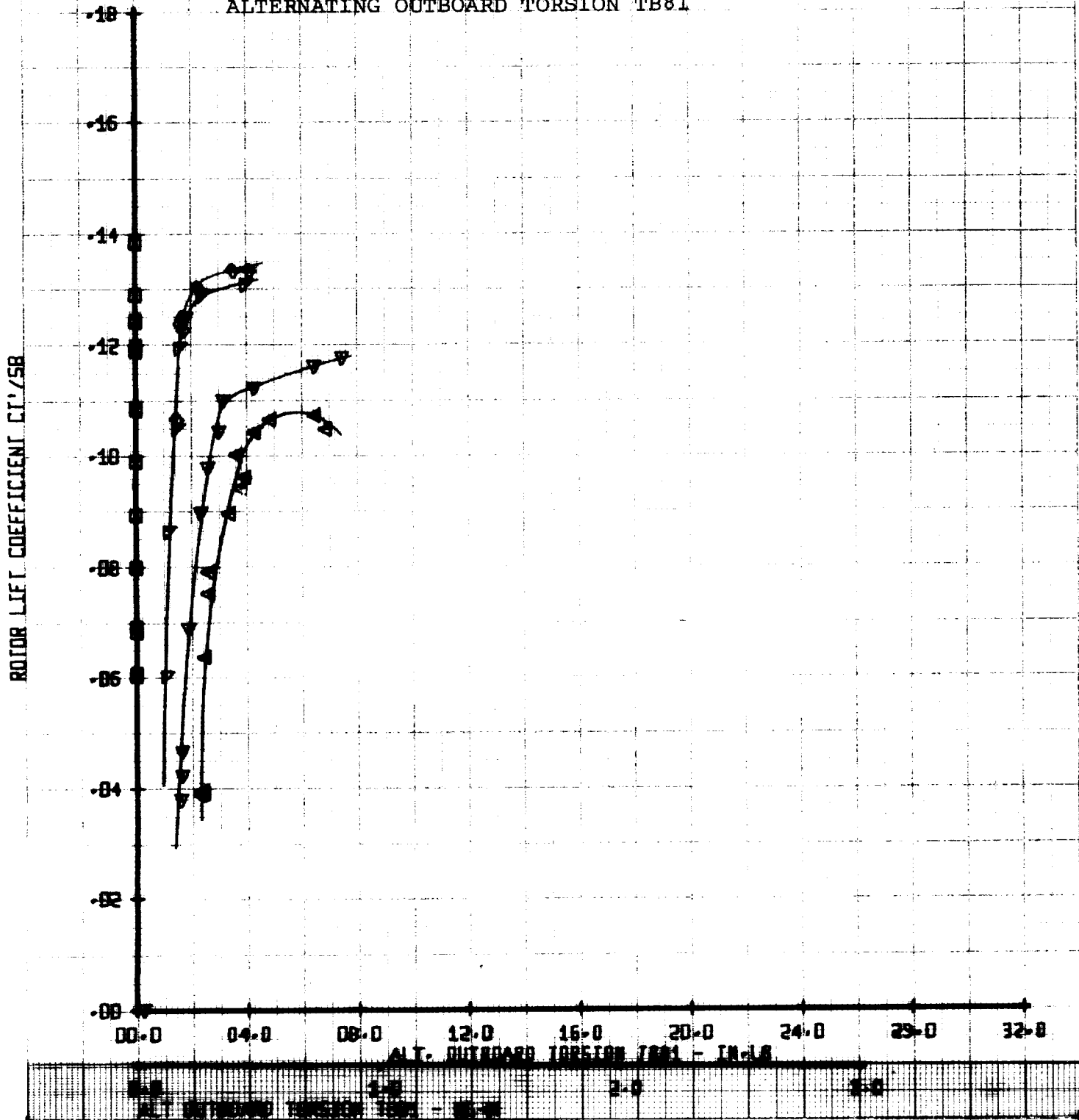


Figure A-41

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/DO258	VTUN
□	25	.10	.05	62
△	27	.20	.10	124
▽	28	.30	.15	124
◇	29	.40	.20	186
◊	30	.50	.25	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

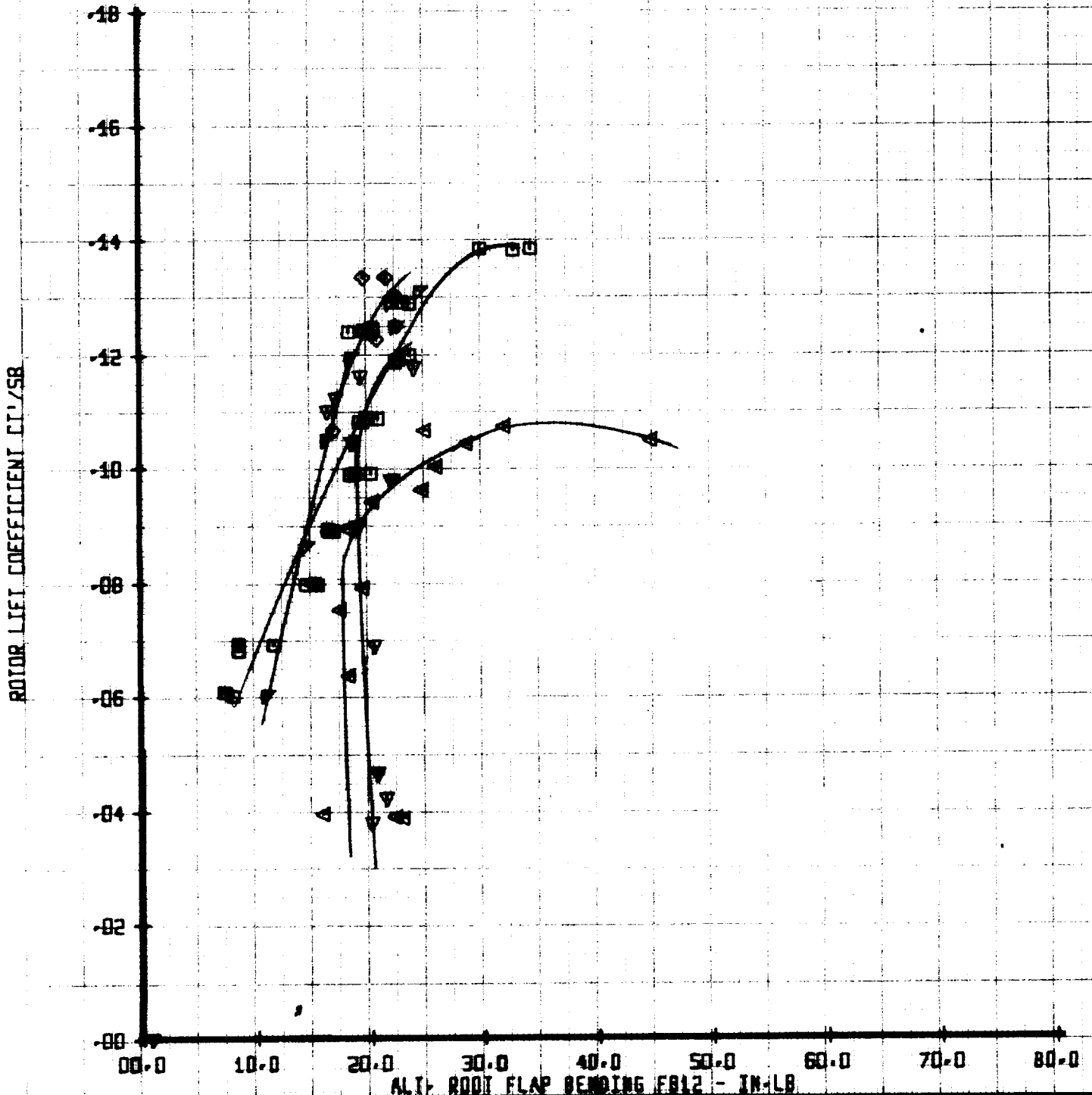


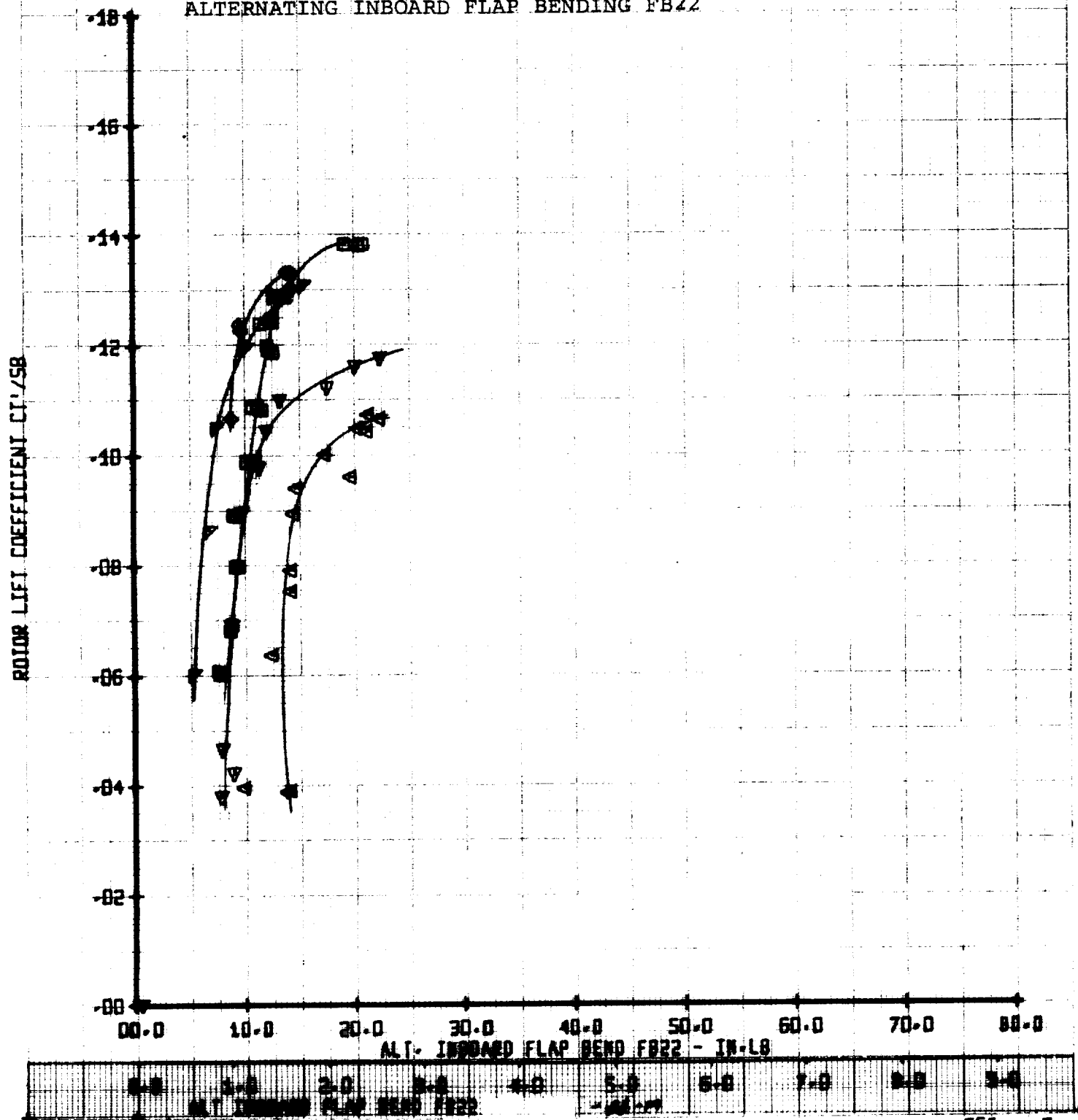
Figure A-42

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
●	25	.10	.01010	62
▲	27	.20	.01010	124
△	28	.30	.01010	124
▽	29	.30	.01010	186
△	30	.40	.01010	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING INBOARD FLAP BENDING FB22

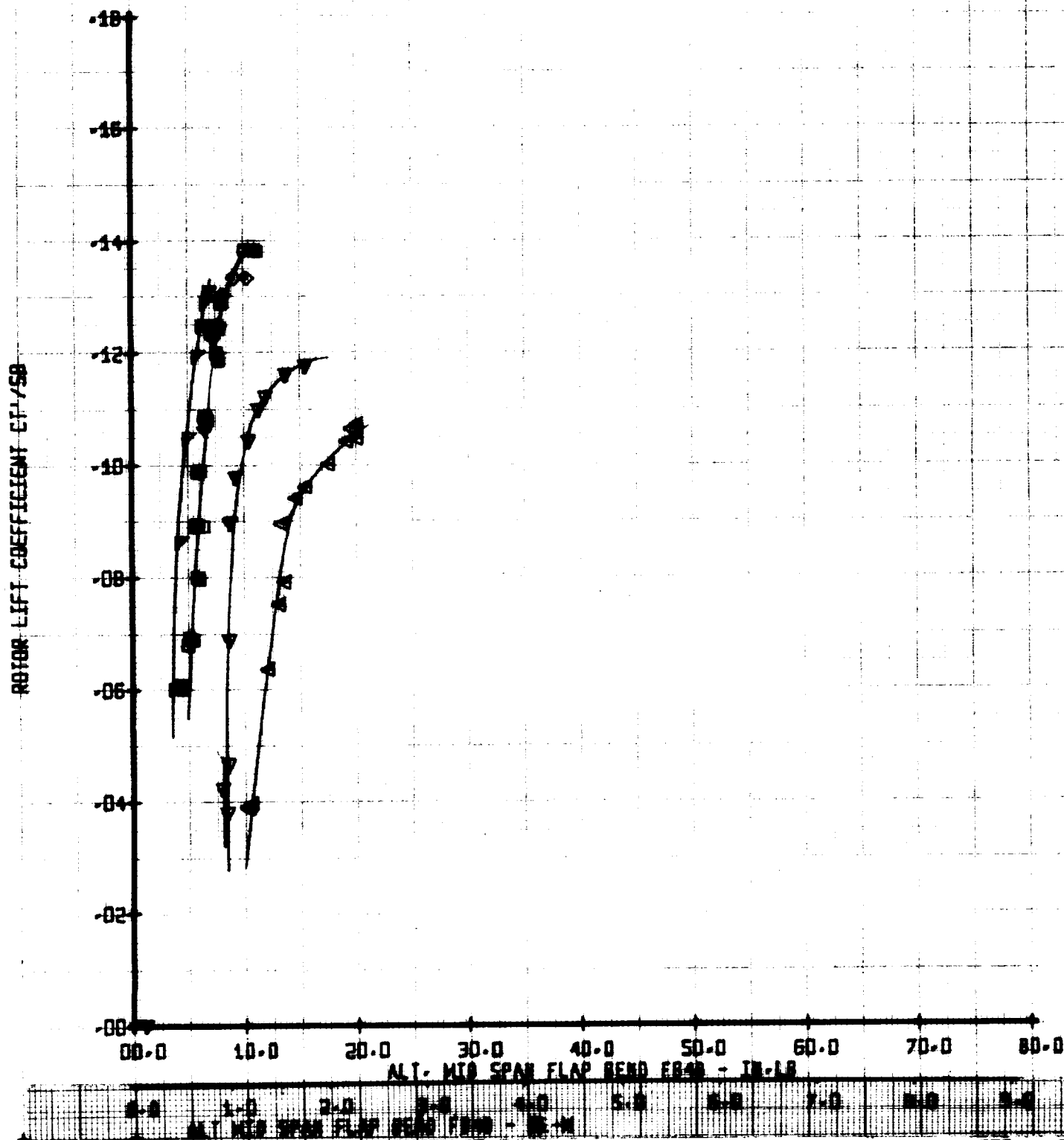


SET 2
BYWT 187

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47D ROTOR
LIFT LIMIT TESTING

SYM	RUN	MC	X/100250	VTUN
▲	25	.10	.0025	62
▼	27	.20	.0050	124
■	28	.30	.0075	124
△	29	.30	.0075	186
◆	30	.40	.0100	248

ROTOR LIFT COEFFICIENT
—VERSUS
ALTERNATING MID SPAN FLAP BENDING FB48



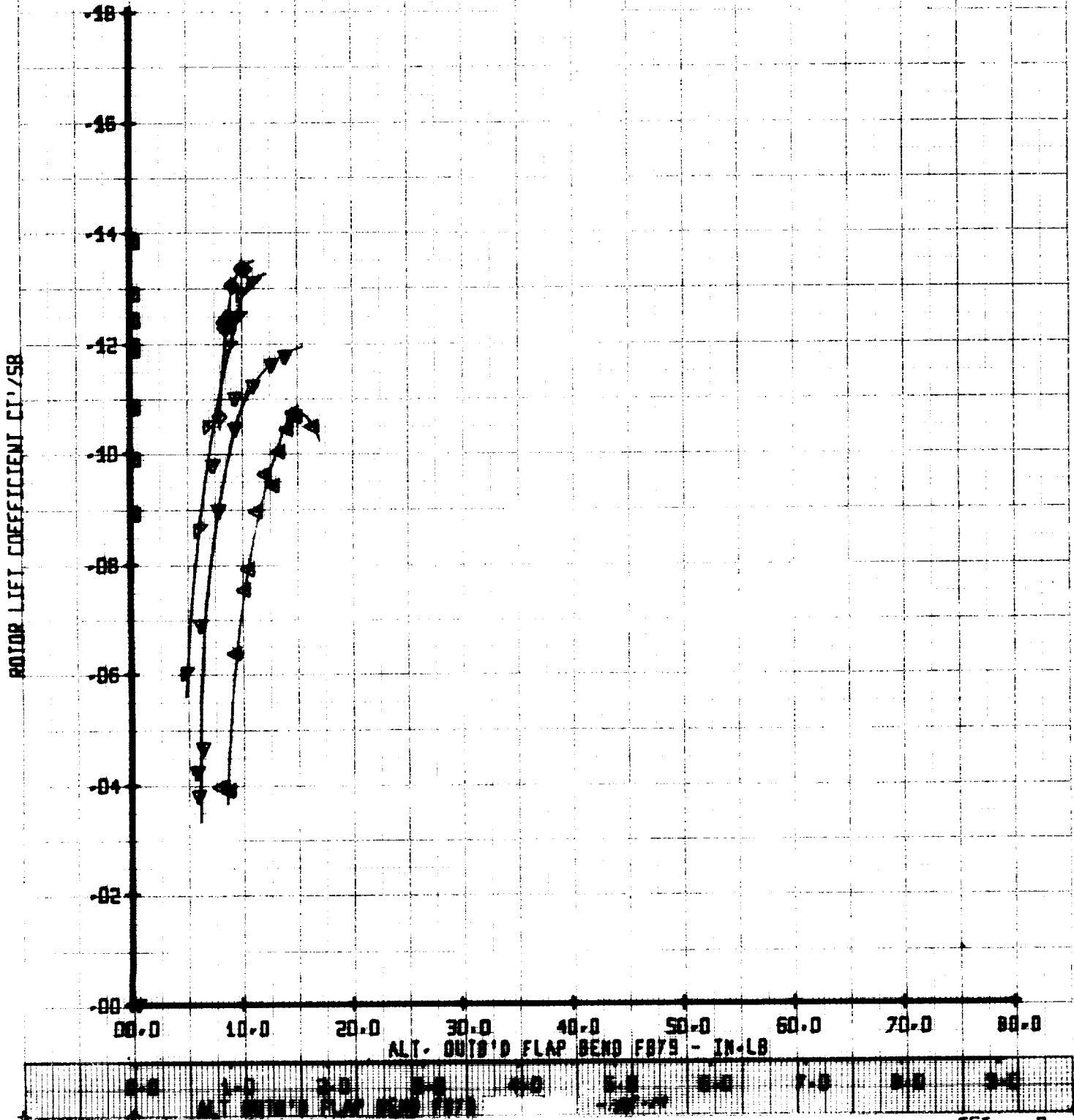
SET 2
BVWT 1A7

Figure A-44

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

5M	RUN	MI	X/DB258	VTUN
25	27	.10	.05	62
28	28	.20	.05	124
30	30	.30	.05	186
		.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD FLAP BENDING FB79



SET 2
BYWT 187

Figure A-45

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/DD2SB	VTUN
44090	25	.10	.05	62
	27	.20	.05	124
	28	.20	.05	124
	29	.30	.05	186
	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

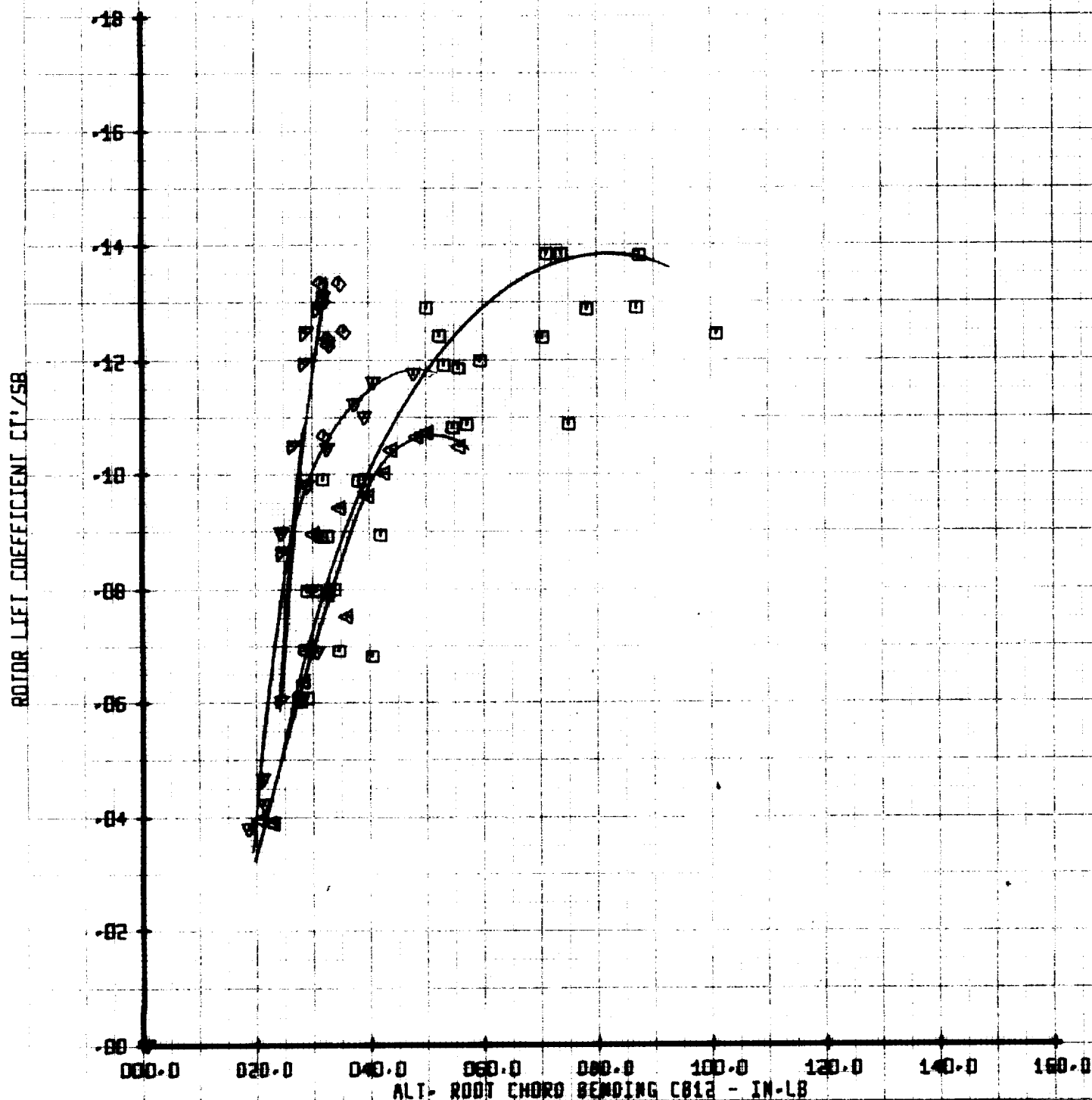


Figure A-46

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/DD2SB	WTUN
□	25	.10	.05	62
△	27	.20	.05	124
◇	28	.20	.05	124
▽	29	.30	.05	186
▲	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN CHORD CB53

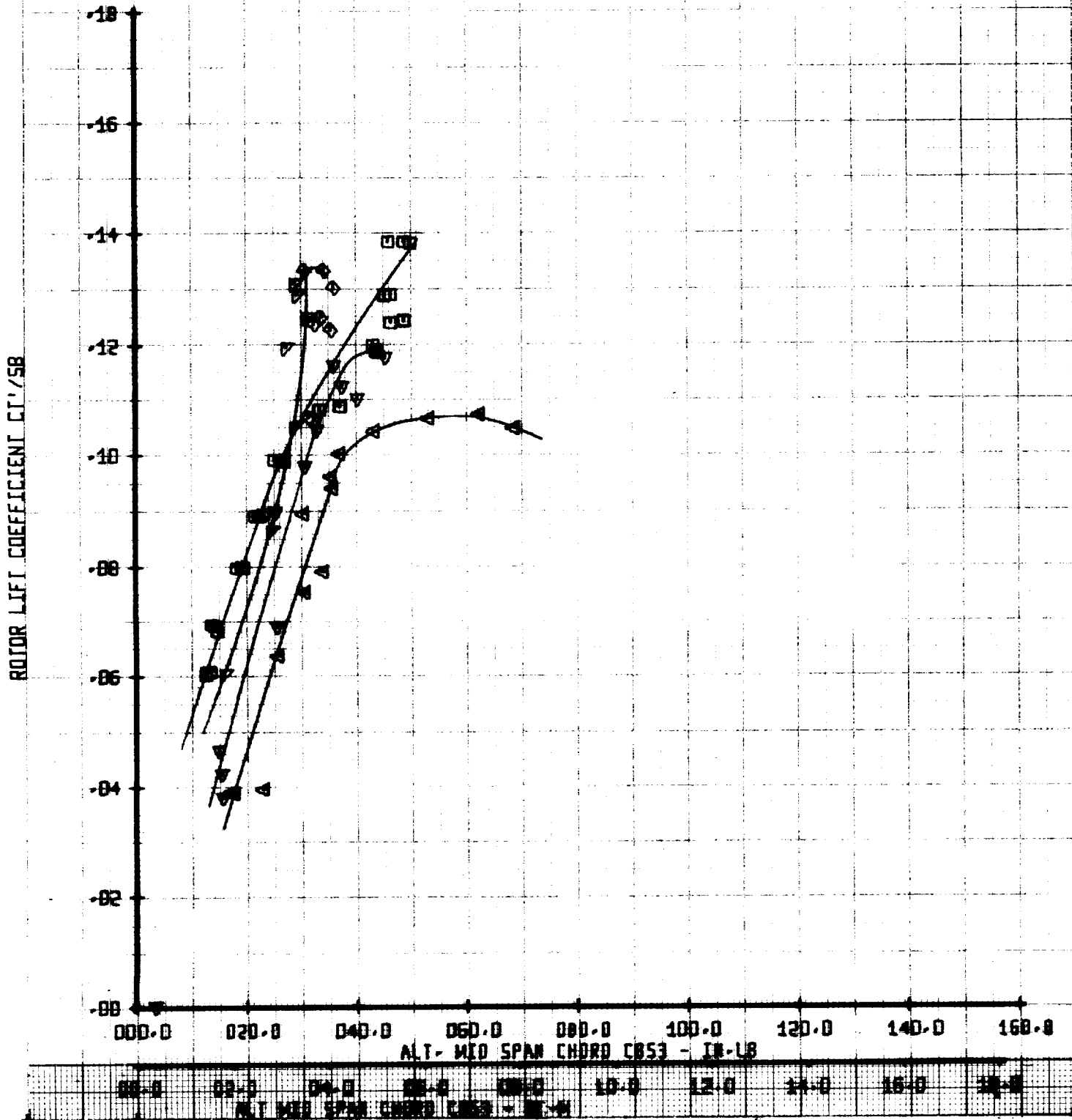
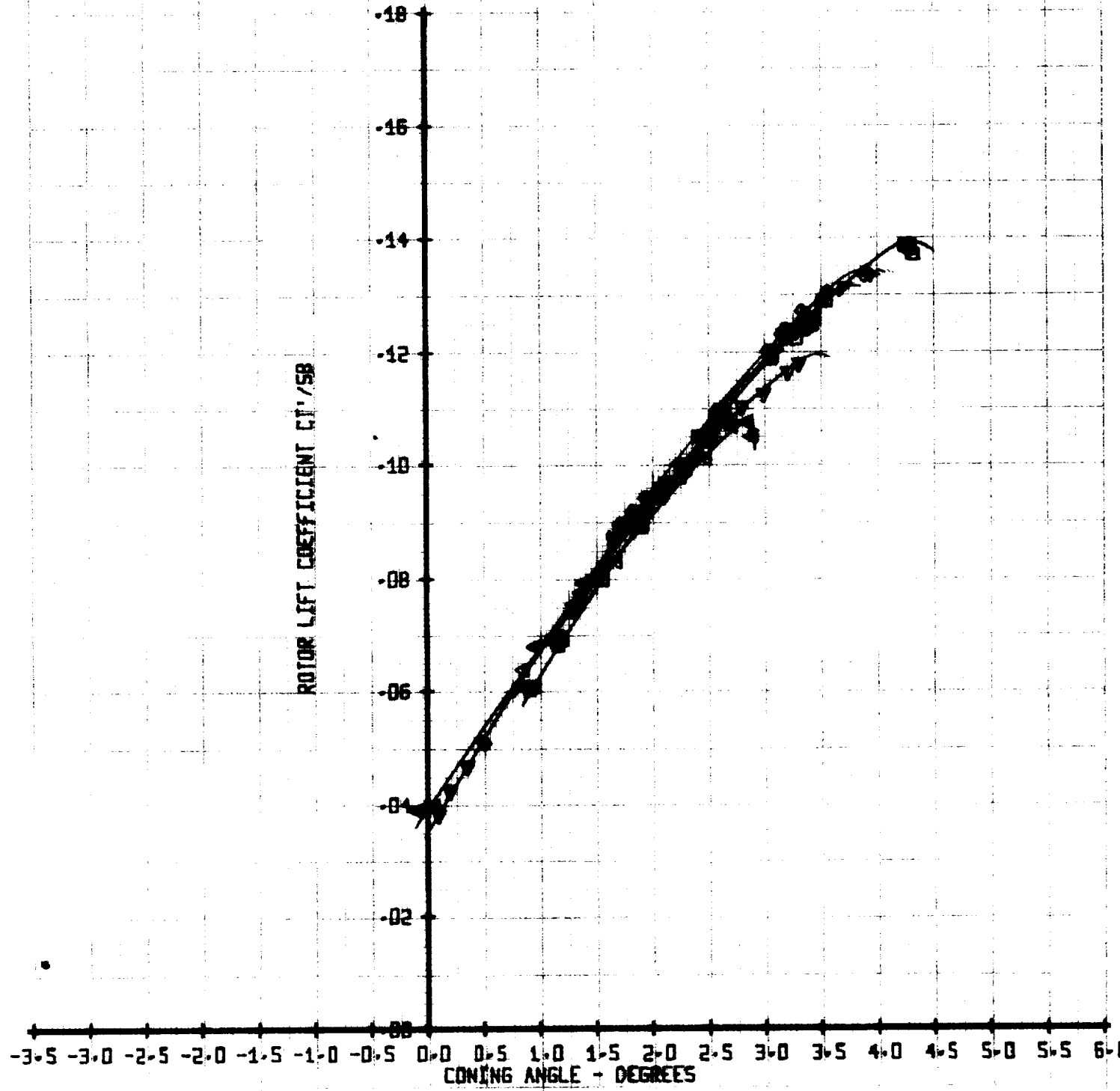


Figure A-47

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	VTUN
A407G	25	.10	.005	62
	27	.20	.005	124
	28	.20	.005	124
	29	.30	.005	186
	30	.40	.005	248

ROTOR LIFT COEFFICIENT
 VERSUS
 CONING ANGLE



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	YTUN
□	25	.10	.05	62
△	27	.20	.15	124
◇	28	.20	.15	124
▽	29	.30	.15	186
▲	30	.40	.15	248

ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1

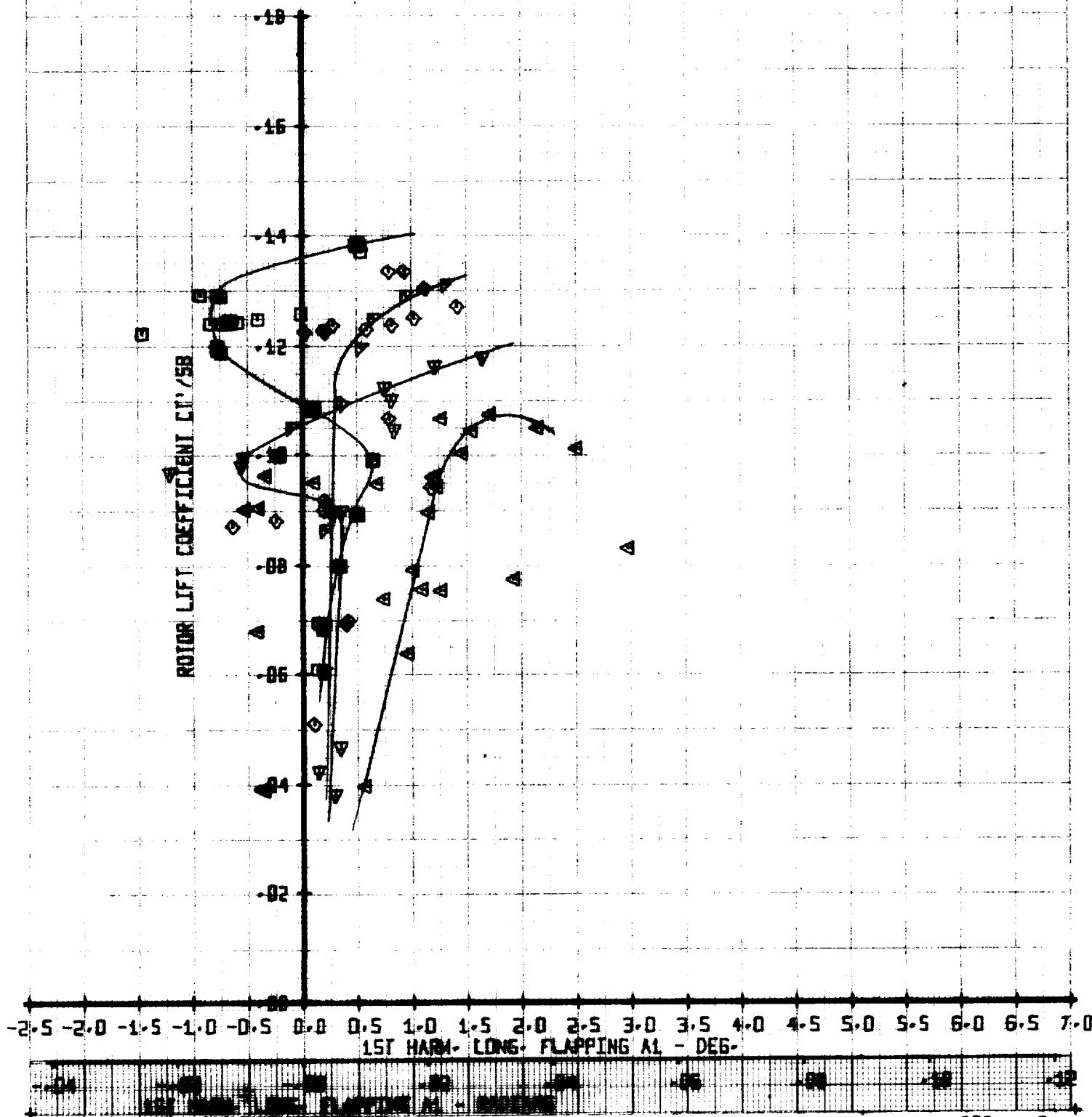


Figure A-49

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	25	.10	.05	62
▽	27	.20	.05	124
◇	28	.20	.05	124
◀	29	.30	.05	186
▲	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

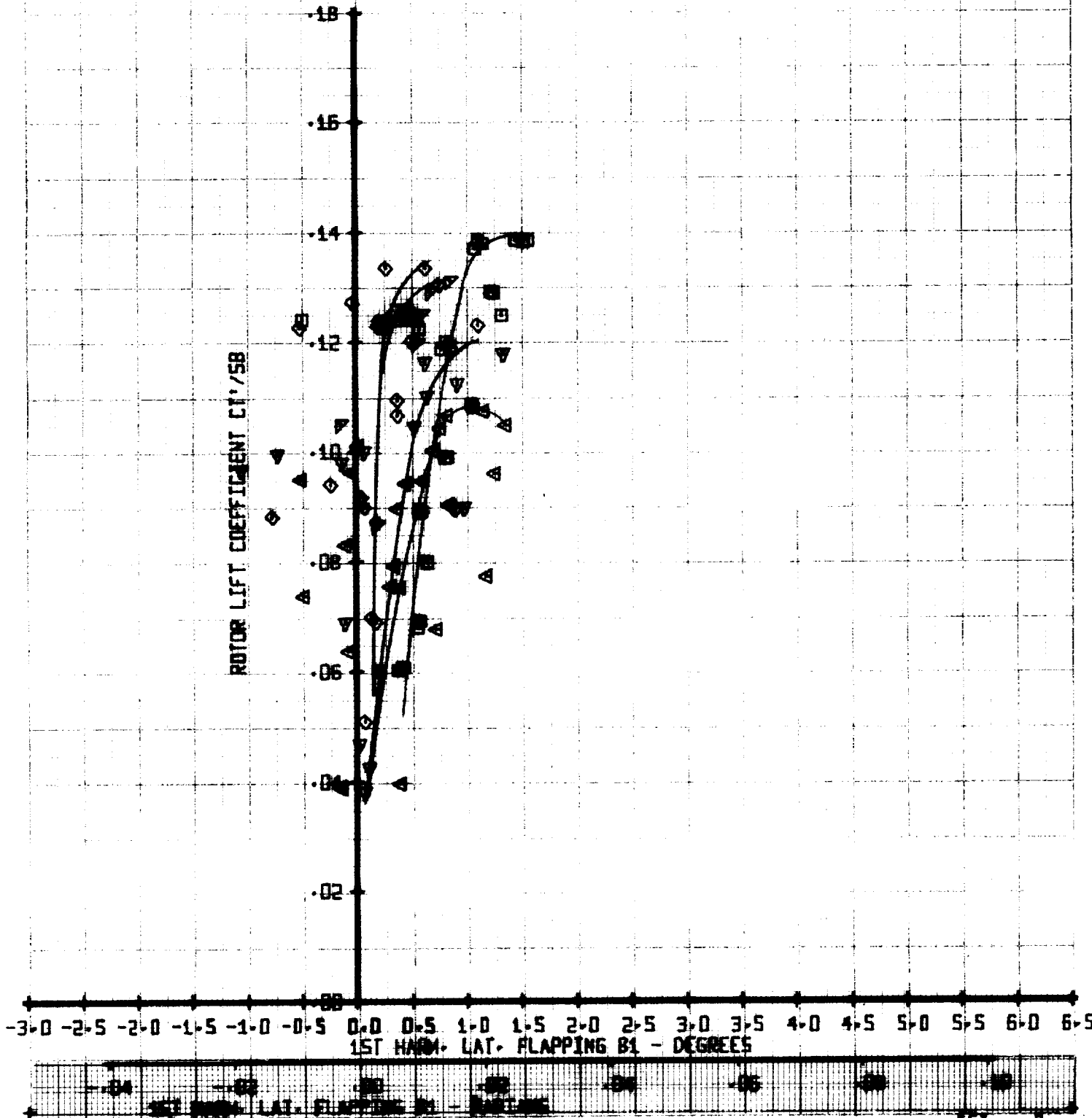


Figure A-50

LIFT-PROPULSIVE FORCE LIMIT TEST

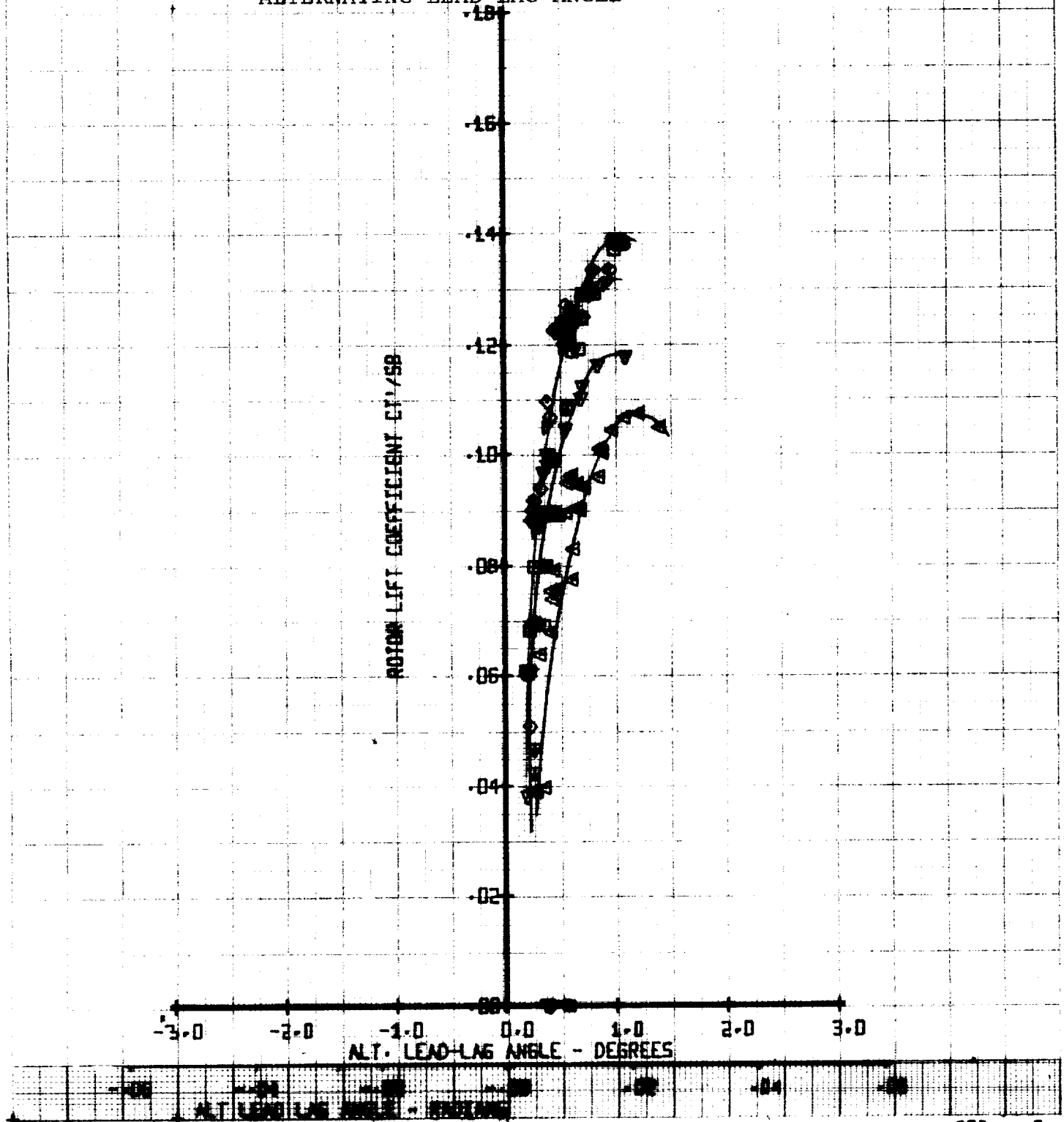
1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
Δ	25	.10	.05	62
▽	27	.20	.05	124
△	28	.20	.05	124
▽	29	.30	.05	186
△	30	.40	.05	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE



SET 2
BVWT 187

Figure A-51

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B MOTOR
LIFT LIMIT TESTING

LEGEND

SYM	MIN	MU	X/DOZSB	VTUN
△	25	.10	.0025	62
▽	27	.20	.0050	124
□	28	.30	.0075	186
◇	30	.40	.0100	248

ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1

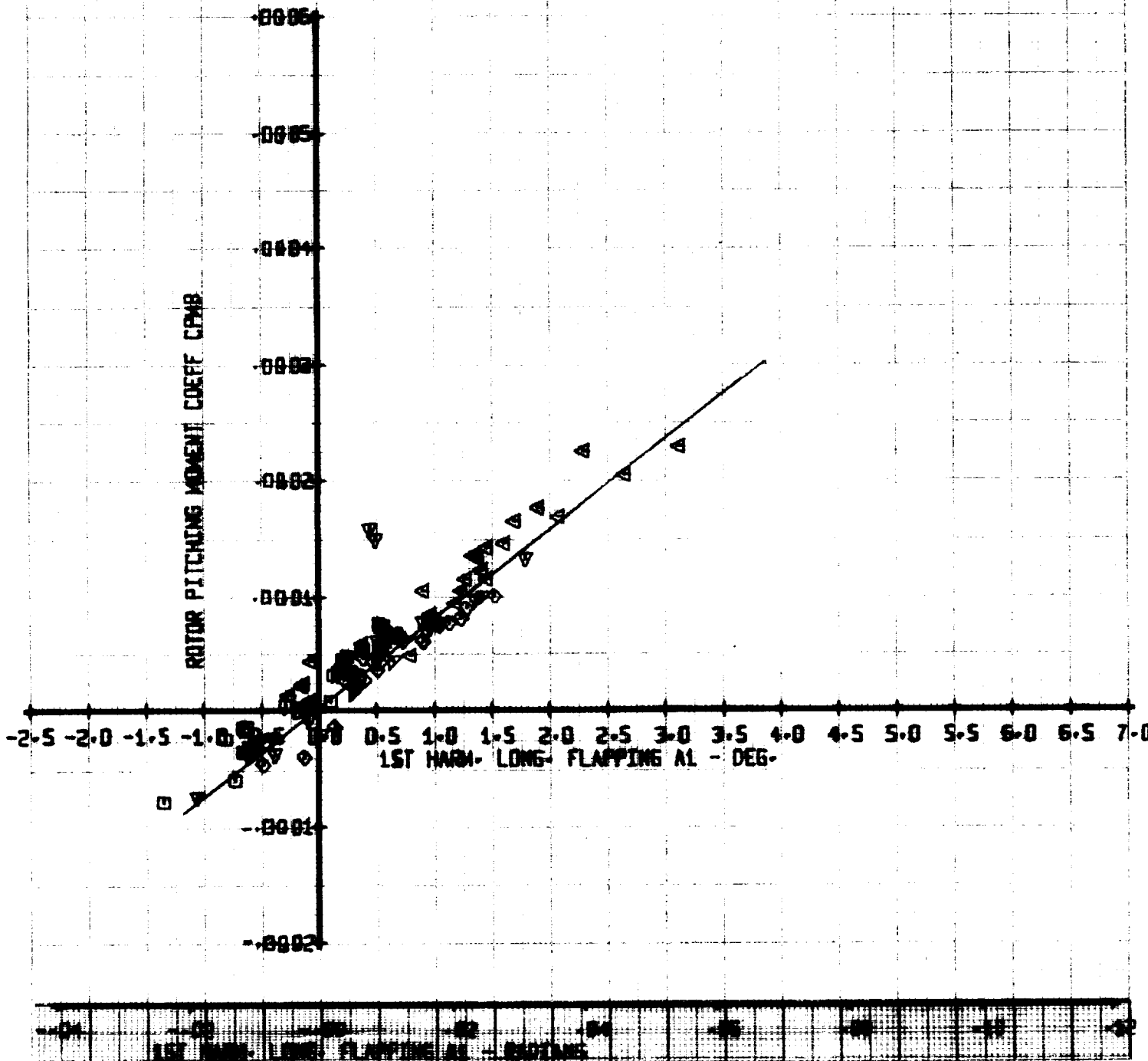


Figure A-52

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'	X/00258	YTUN
□	25	.10	.05	62
▲	27	.20	.05	124
◆	28	.20	.05	124
▼	29	.30	.05	186
△	30	.40	.05	248

ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

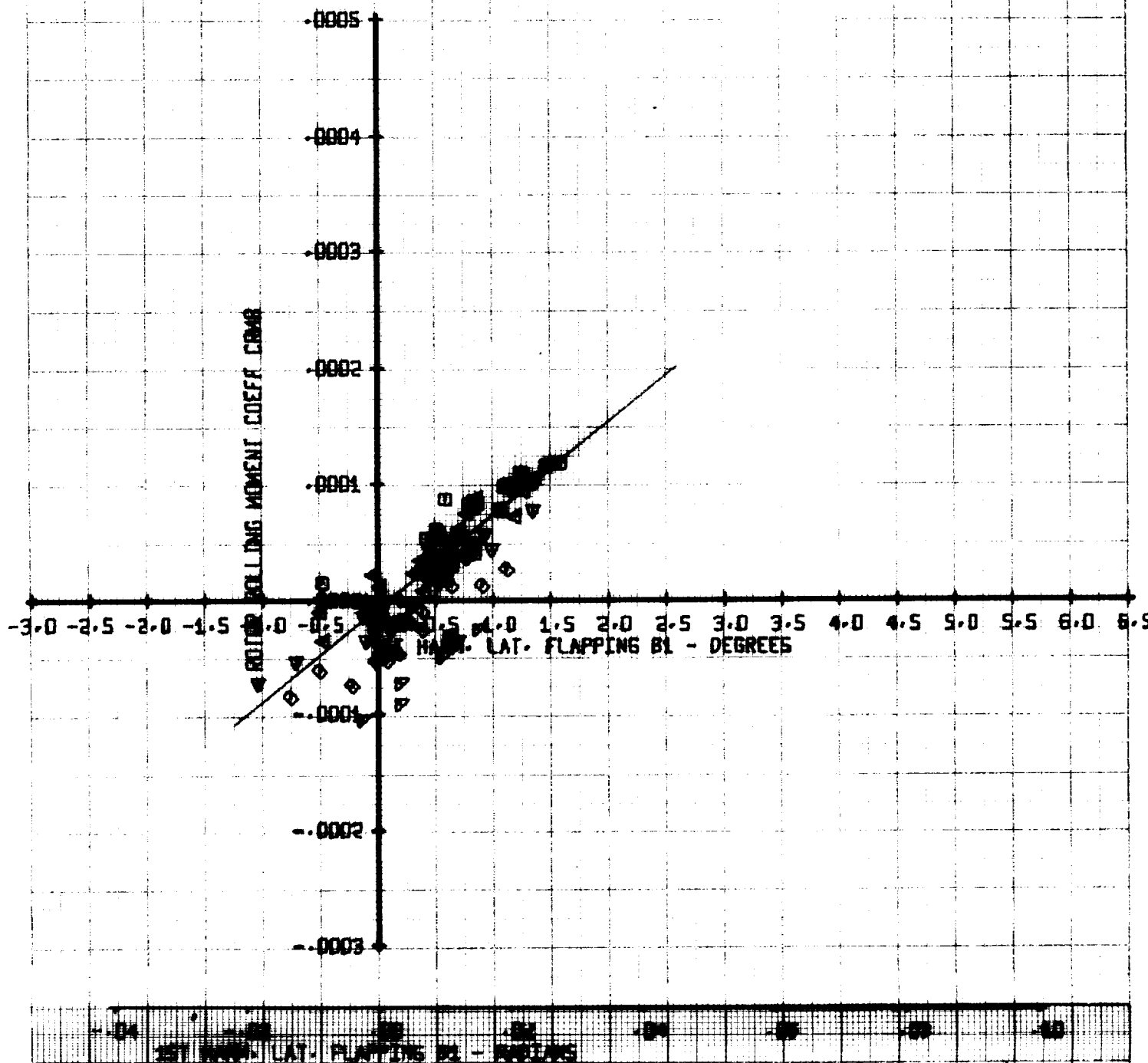


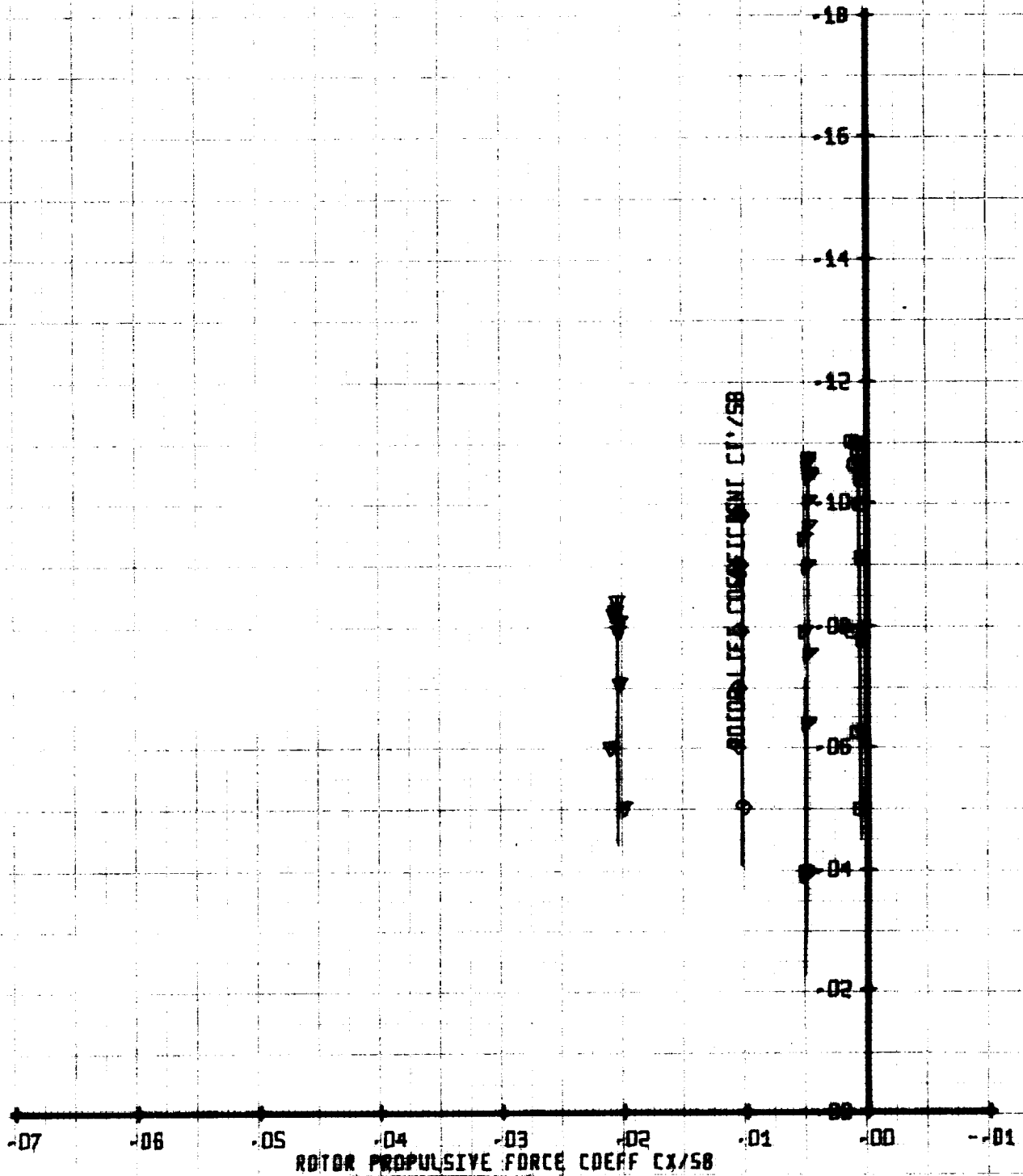
Figure A-53

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTIN
32	32	.40	.01	248
30	30	.40	.05	248
33	33	.40	.10	248
34	34	.40	.20	248

ROTOR LIFT COEFFICIENT
 VERSUS
 ROTOR PROPULSIVE FORCE COEFFICIENT



SET 3
 BVWT 187

Figure A-54

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK

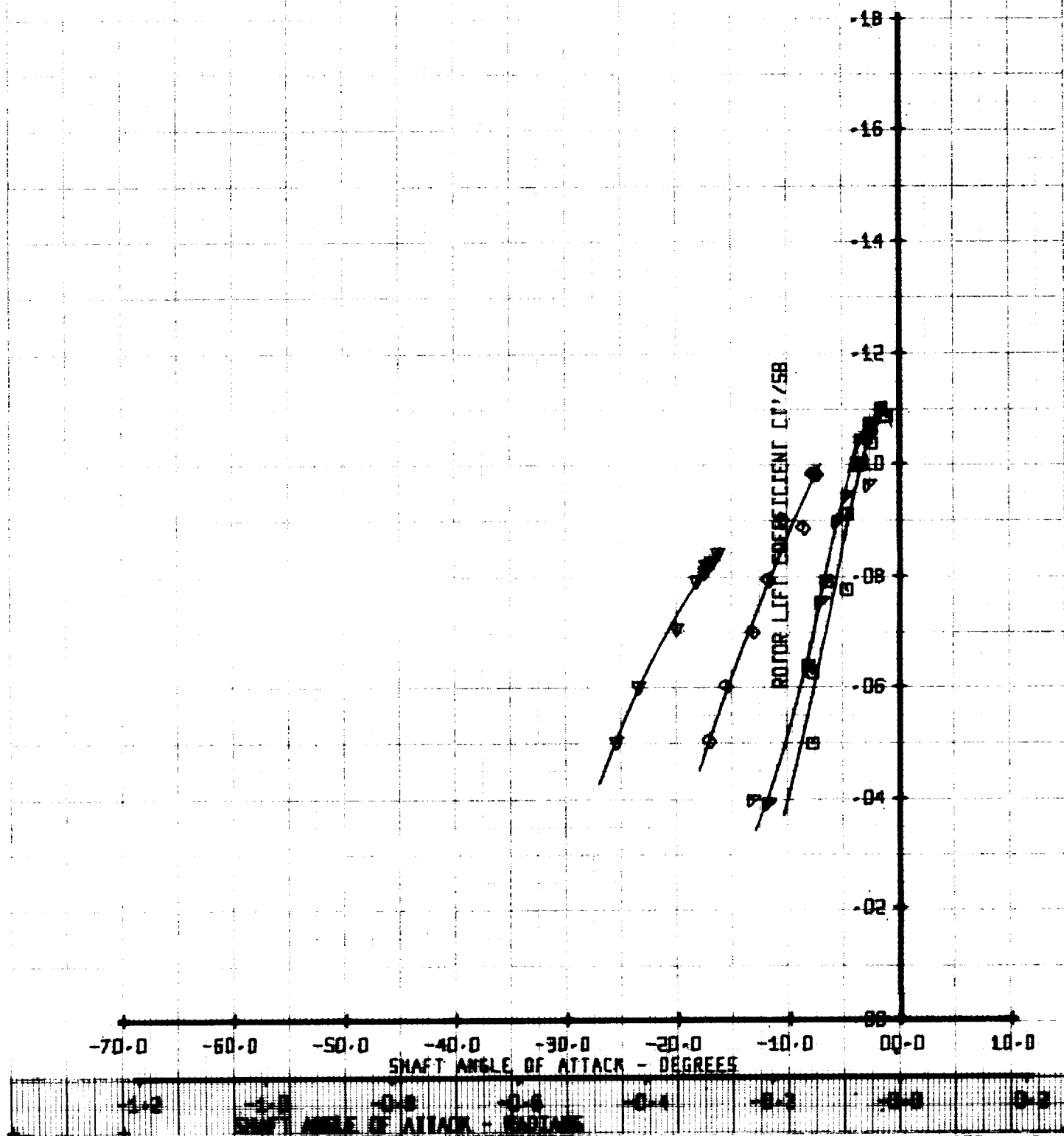


Figure A-55

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MJ	X/DD2SB	VTLN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH

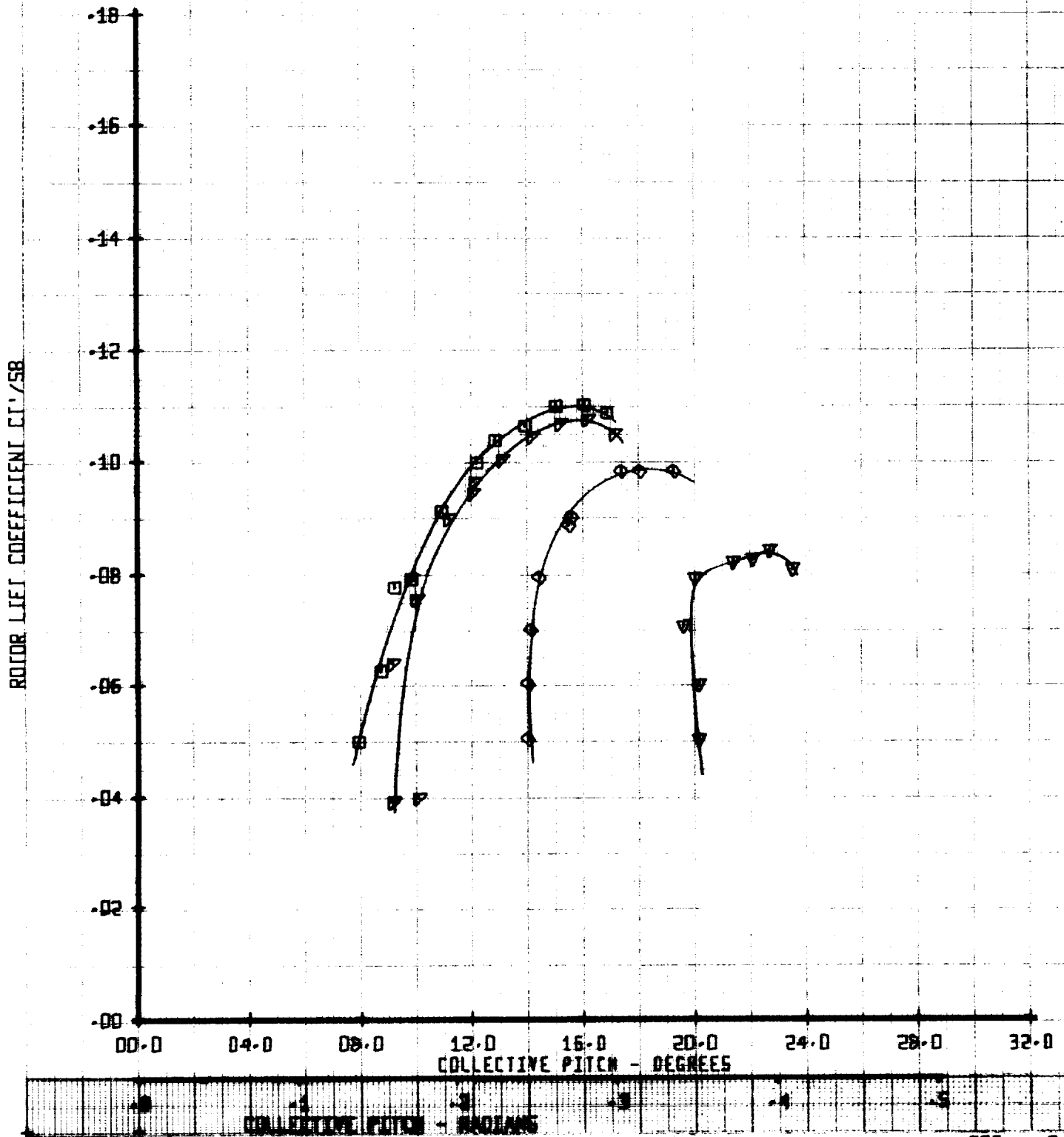


Figure A-56

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'	X/00258	VTUN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
LONGITUDINAL CYCLIC

ROTOR LIFT COEFFICIENT $C_L/58$

18
16
14
12
10
8
6
4
2
0

08.0 04.0 00.0 04.0 08.0 12.0 16.0 20.0 24.0

LONGITUDINAL CYCLIC - DEGREES

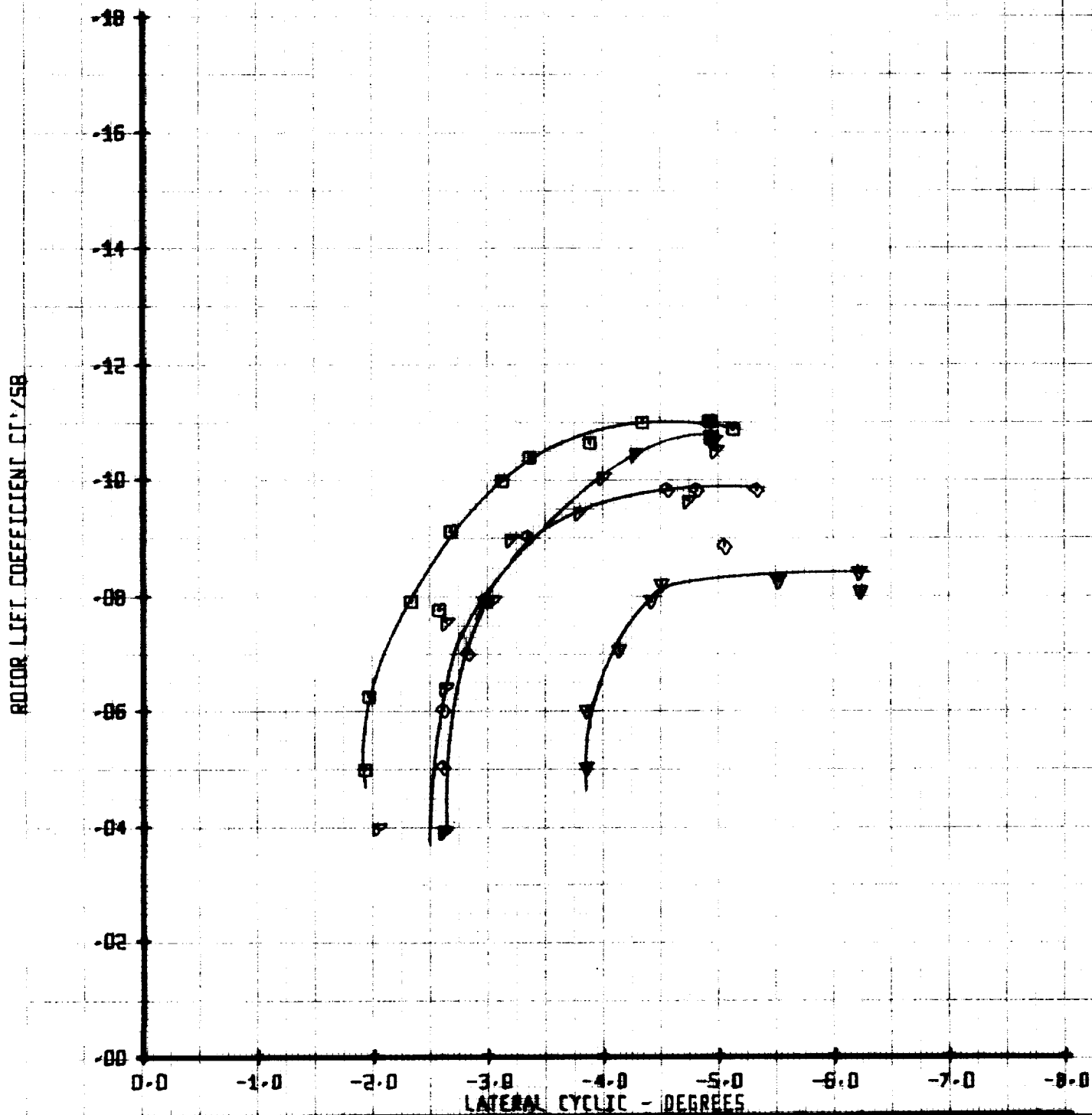
Figure A-57

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
LATERAL CYCLIC



LATERAL CYCLIC - DEGREES

Figure A-58

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	32	.40	.01	248
▽	30	.40	.05	248
◇	33	.40	.10	248
▼	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT

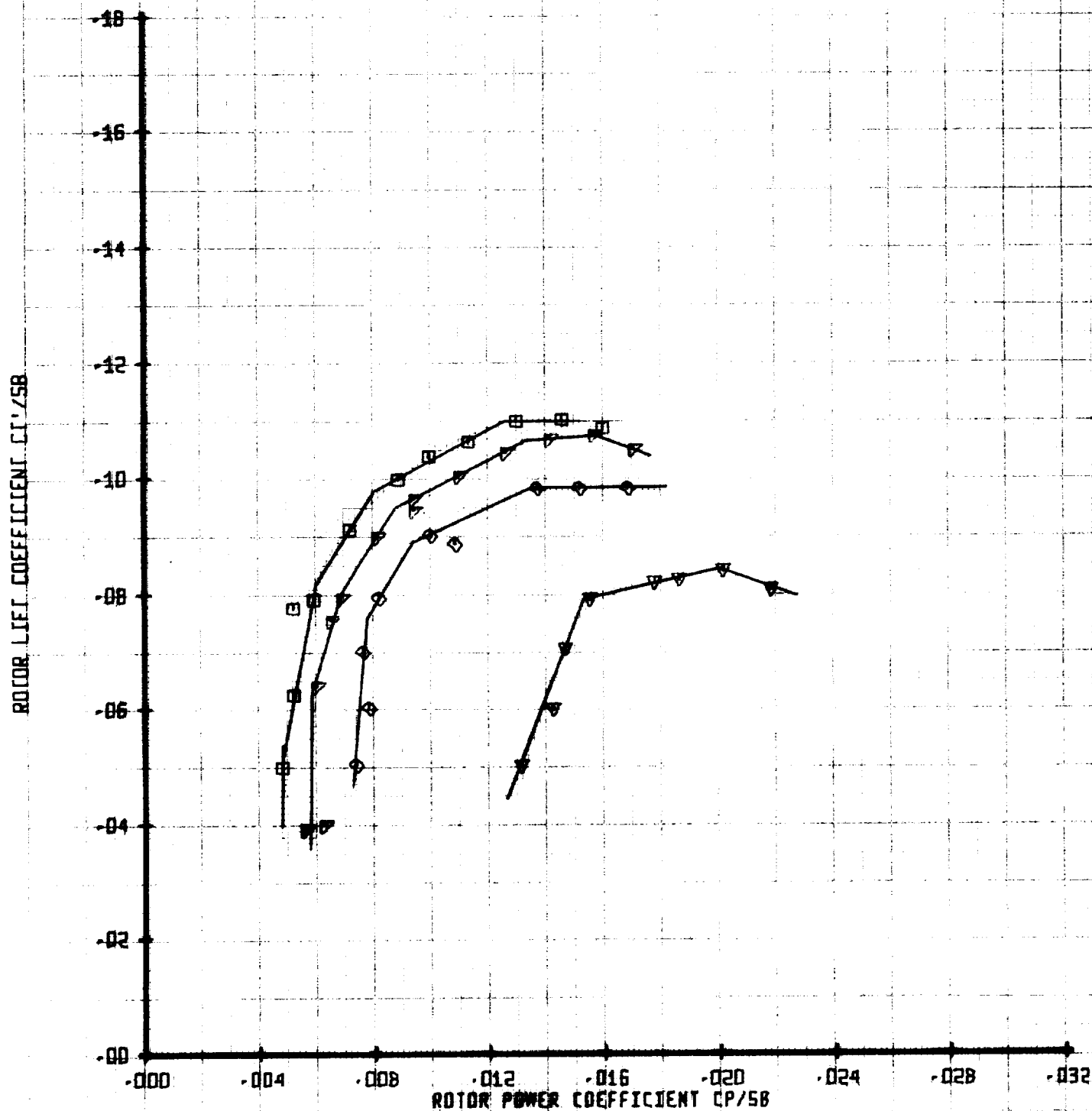


Figure A-59

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DD2SB	VTUN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT

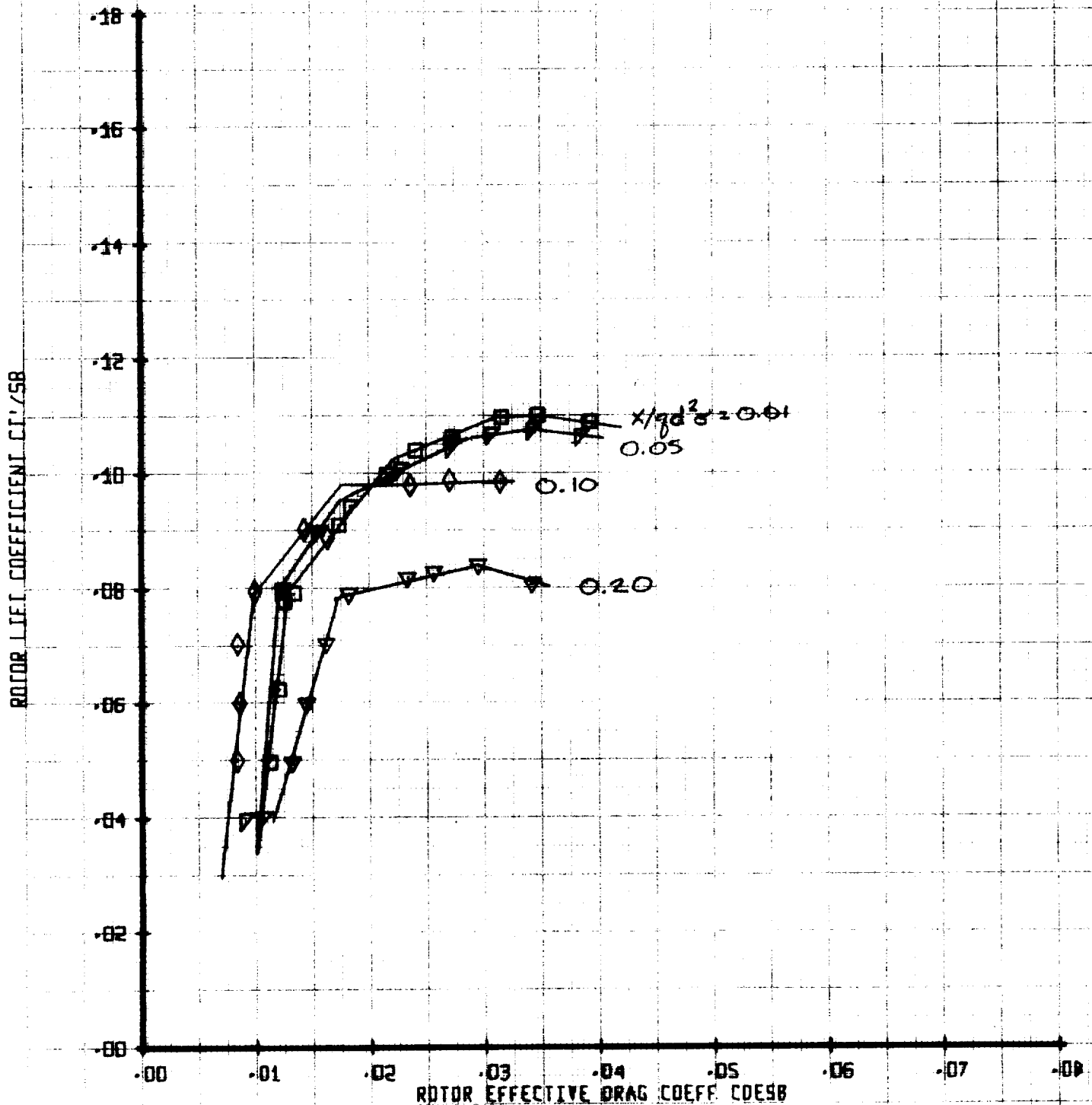


Figure A-60

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-42B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.16	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

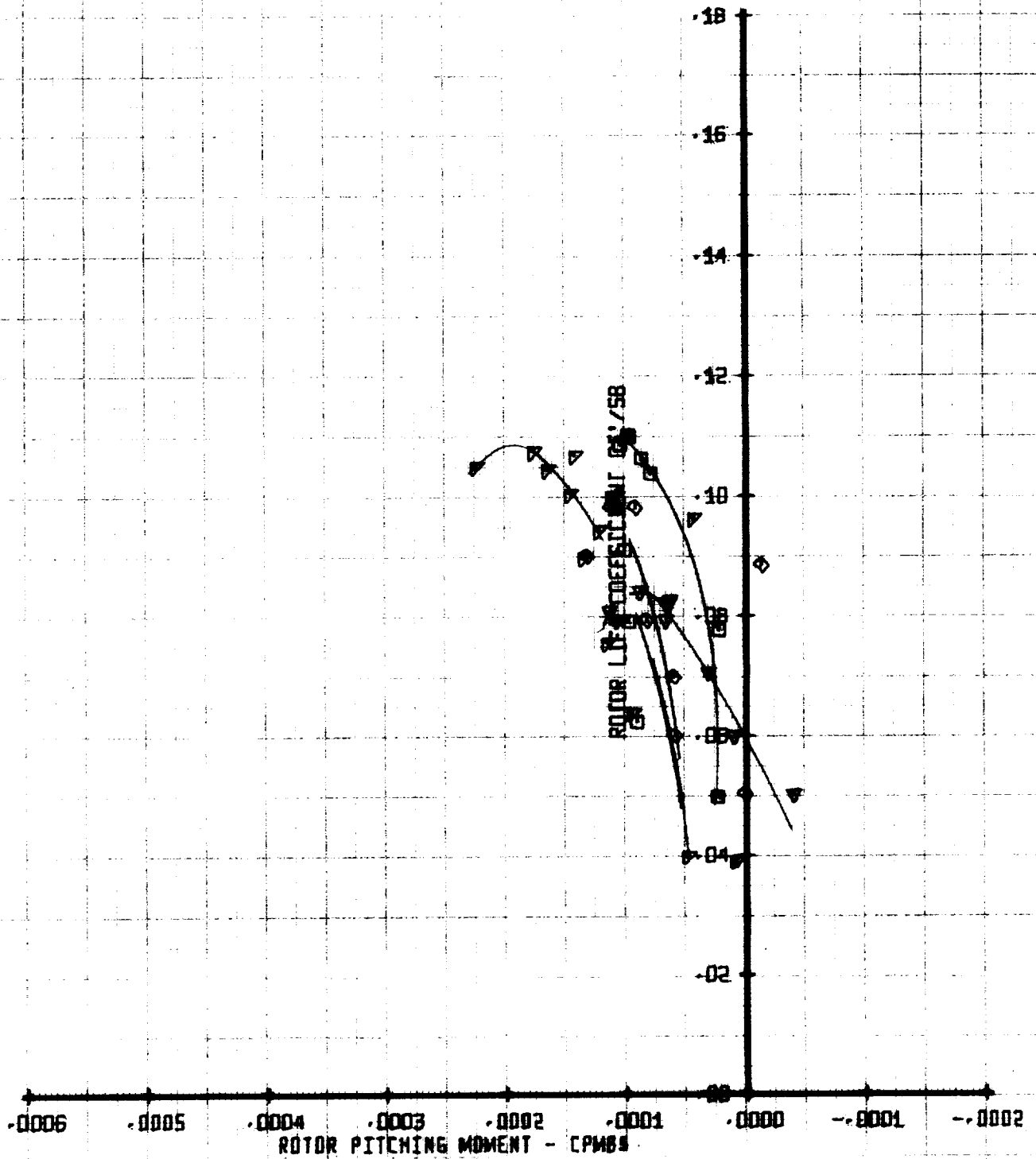


Figure A-61

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT

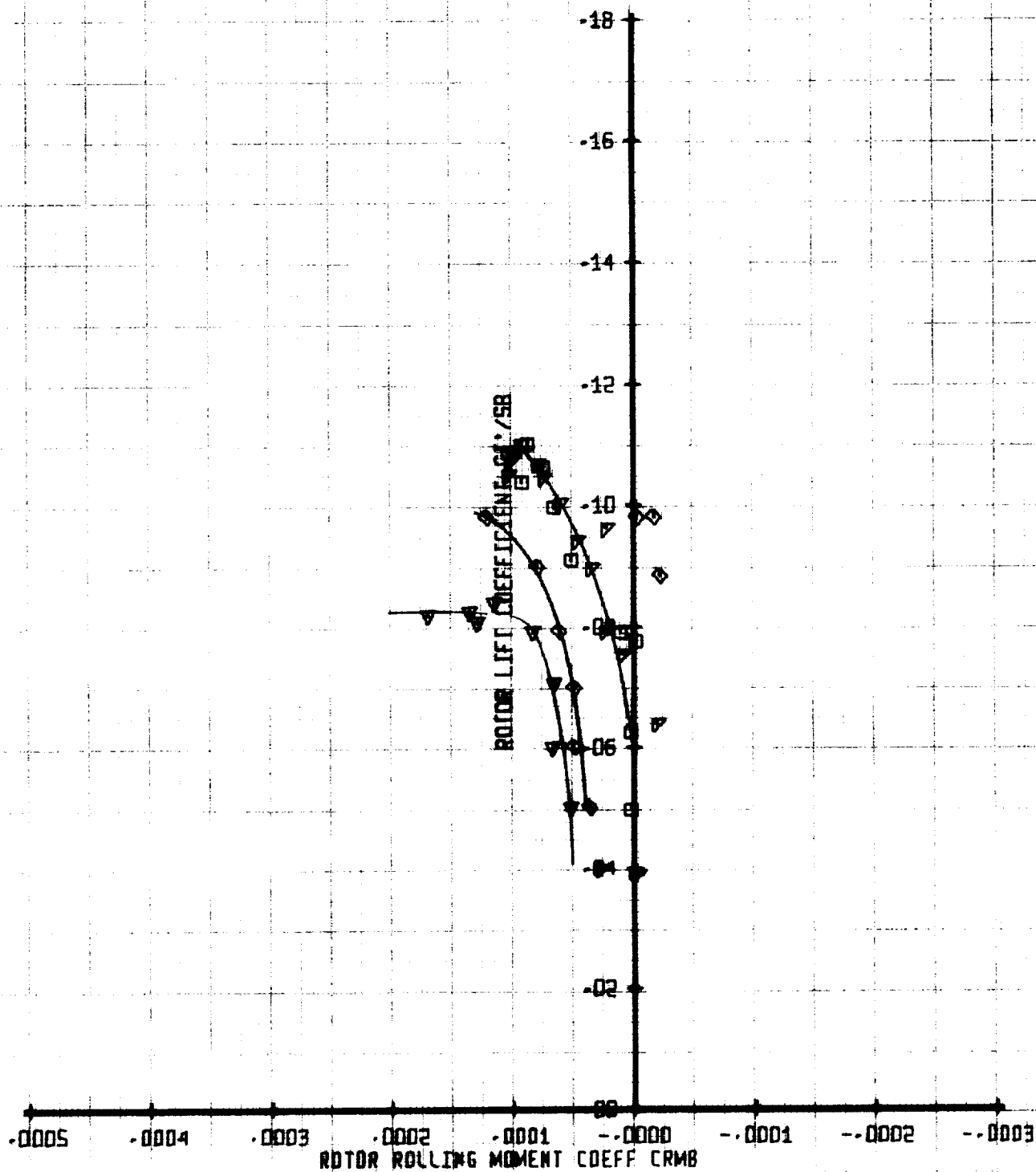


Figure A-62

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'	X/00258	VTUN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT

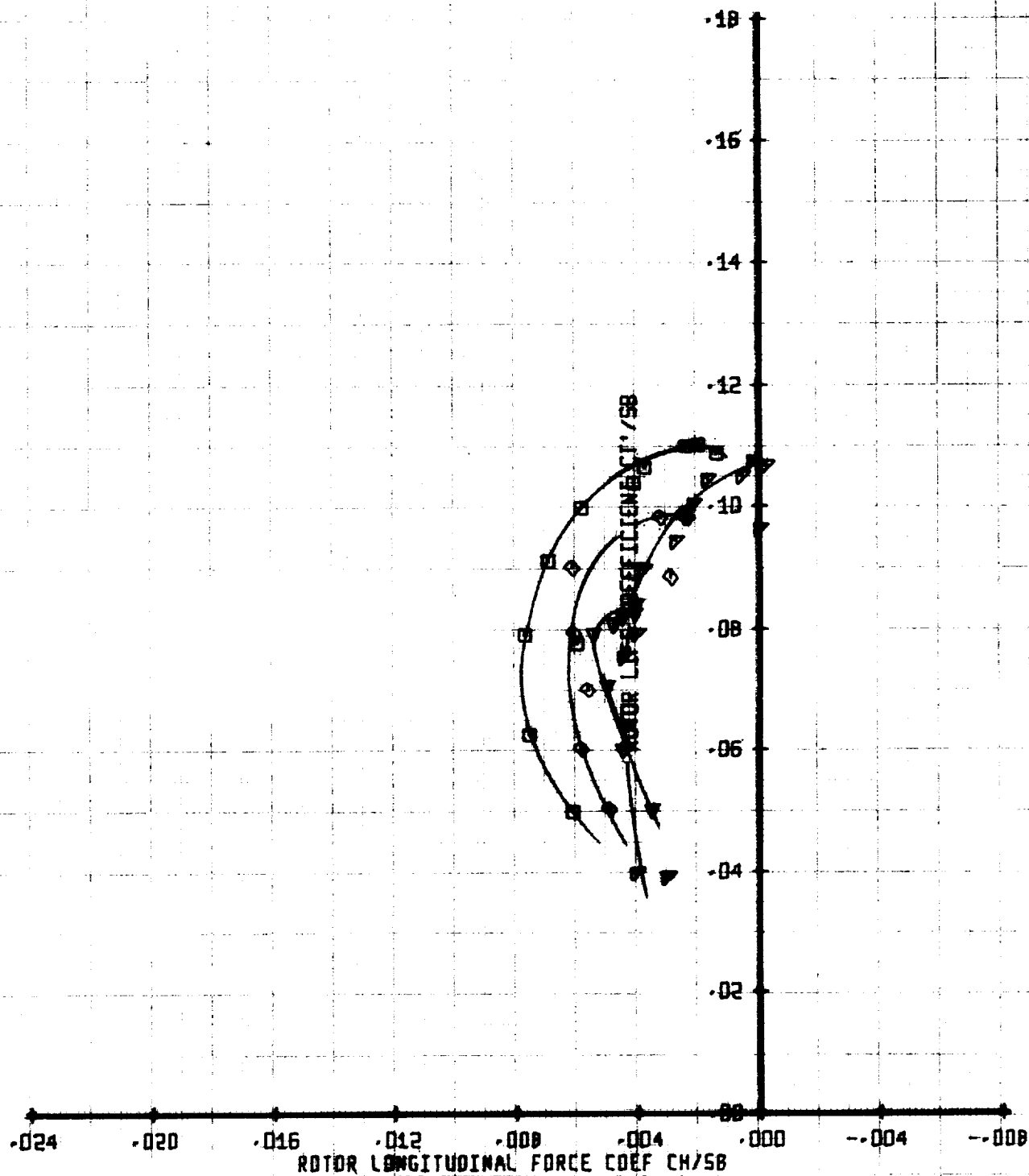


Figure A-63

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MI	X/00258	VTUN
○	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT

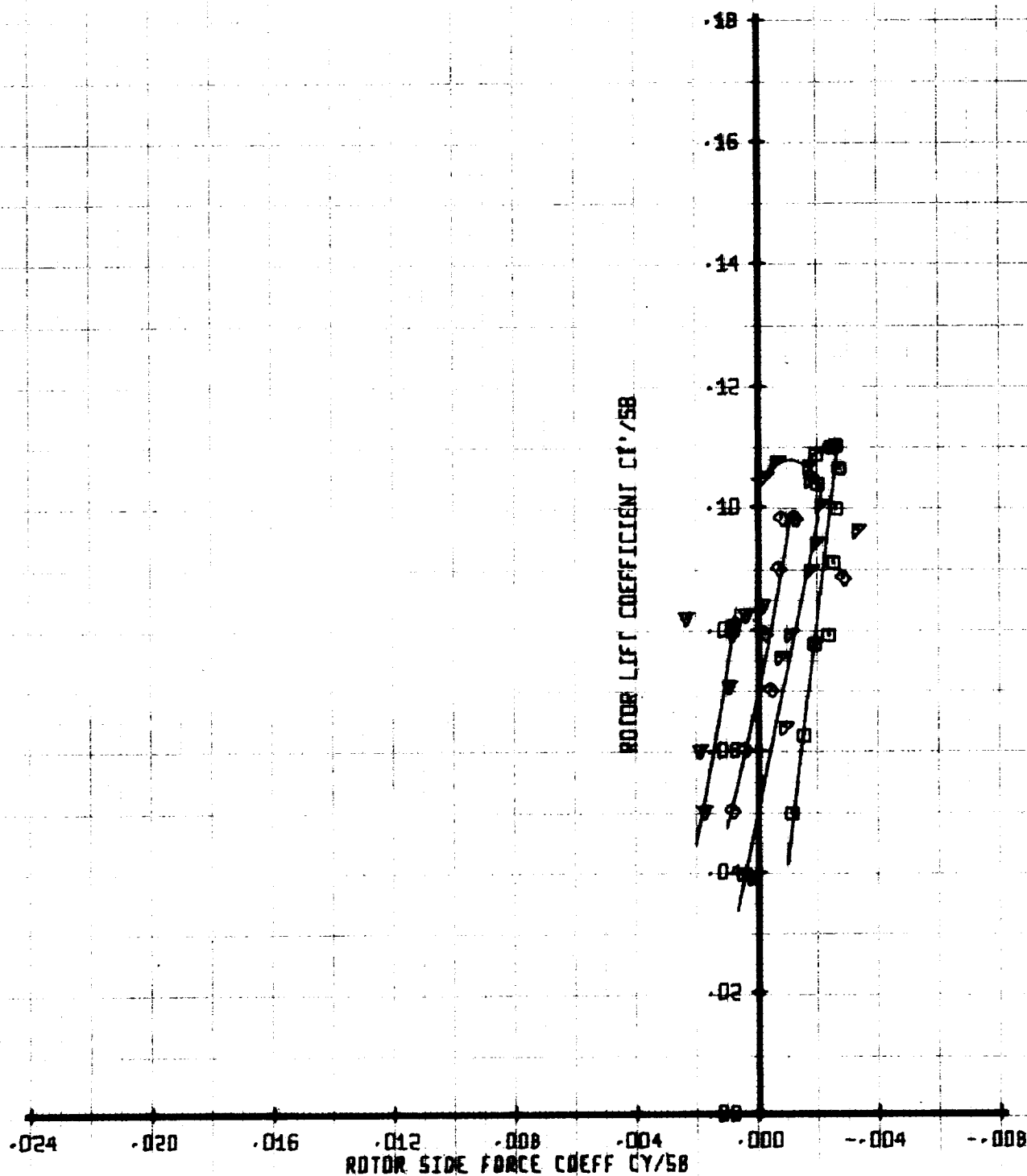


Figure A-64

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	Y/TUN
□	32	.40	.01	248
◇	30	.40	.05	248
△	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TBL2

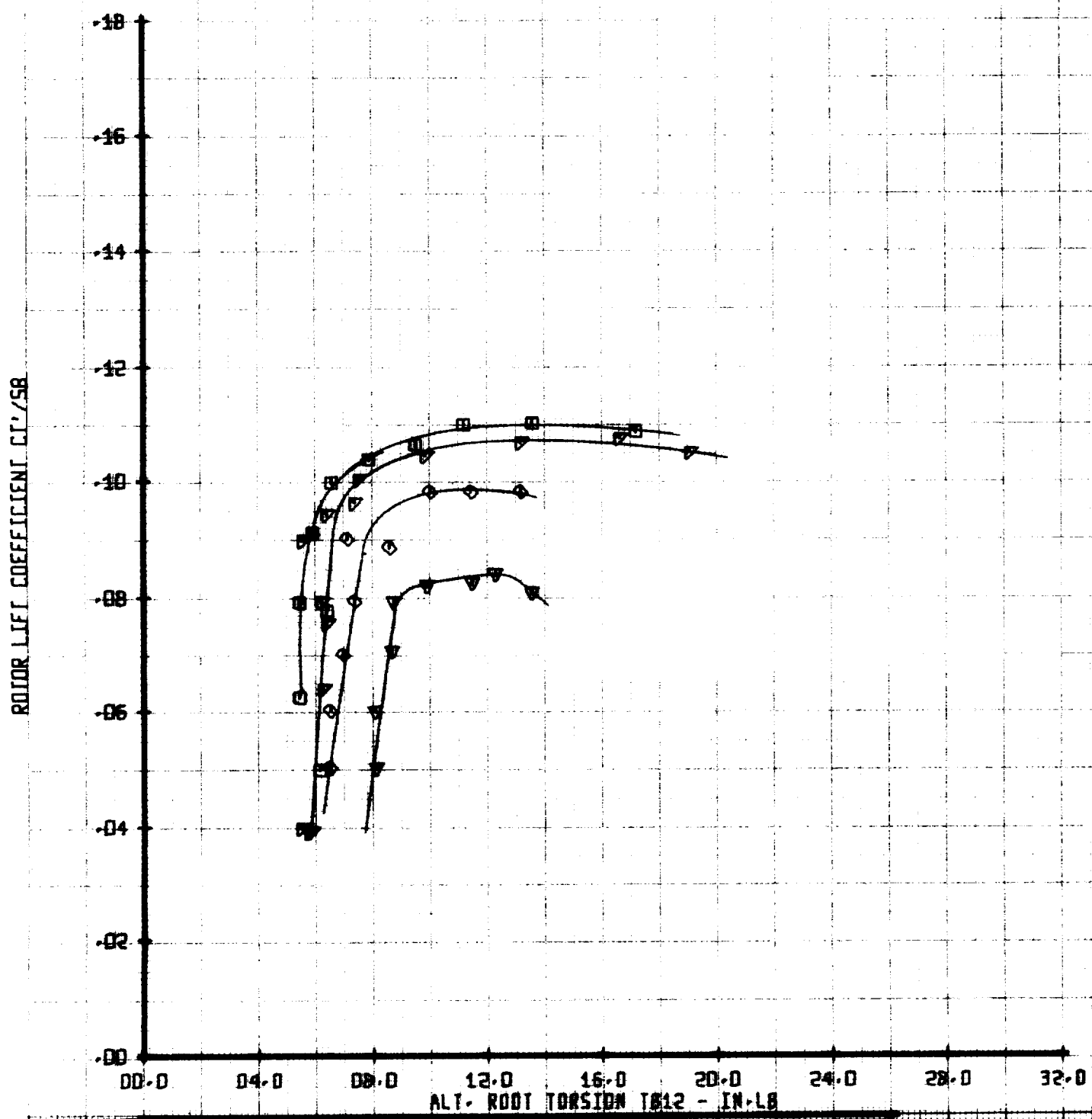


Figure A-65

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING INBOARD TORSION TB20

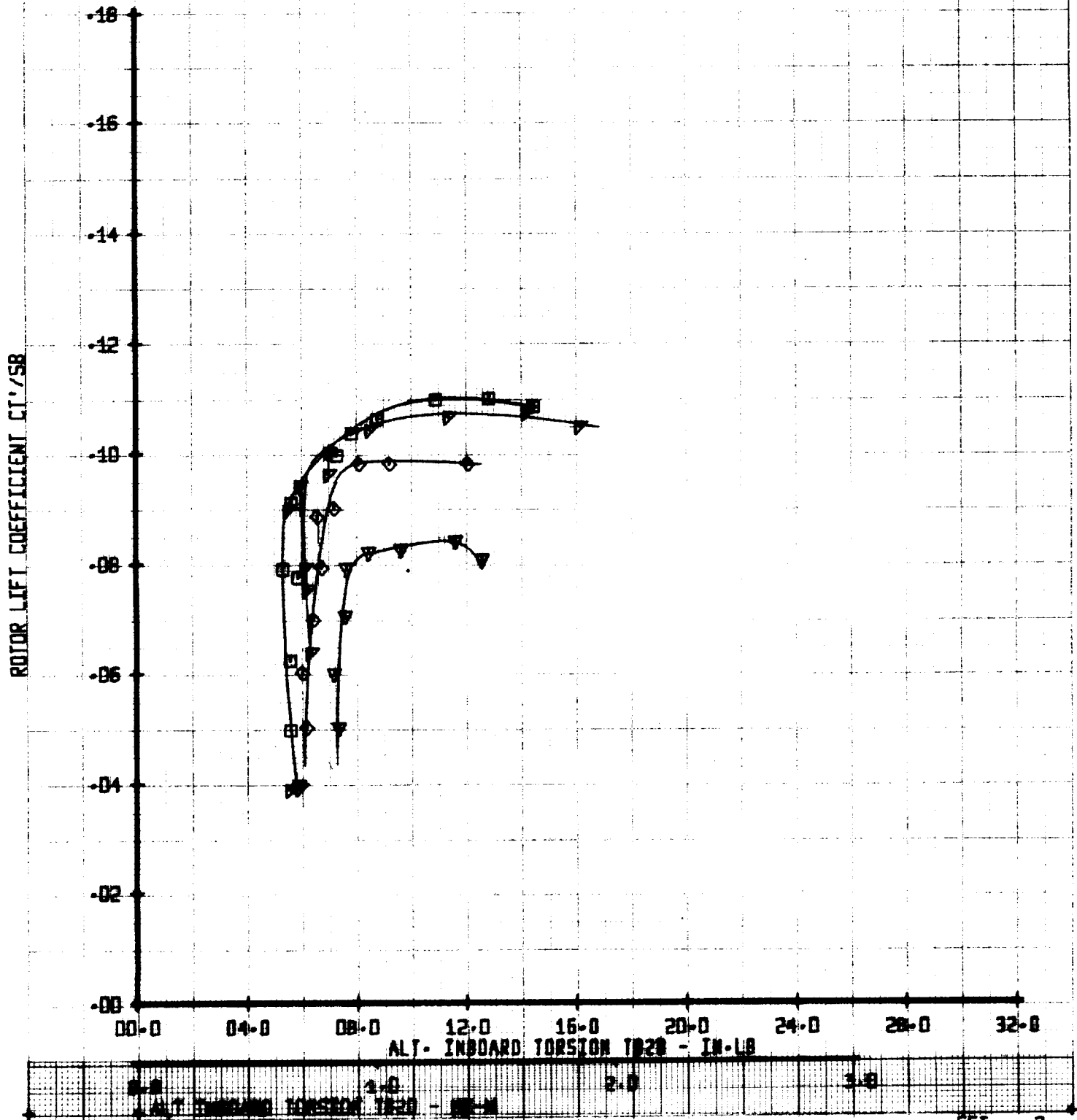


Figure A-66

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	32	.40	.01	248
▴	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB51

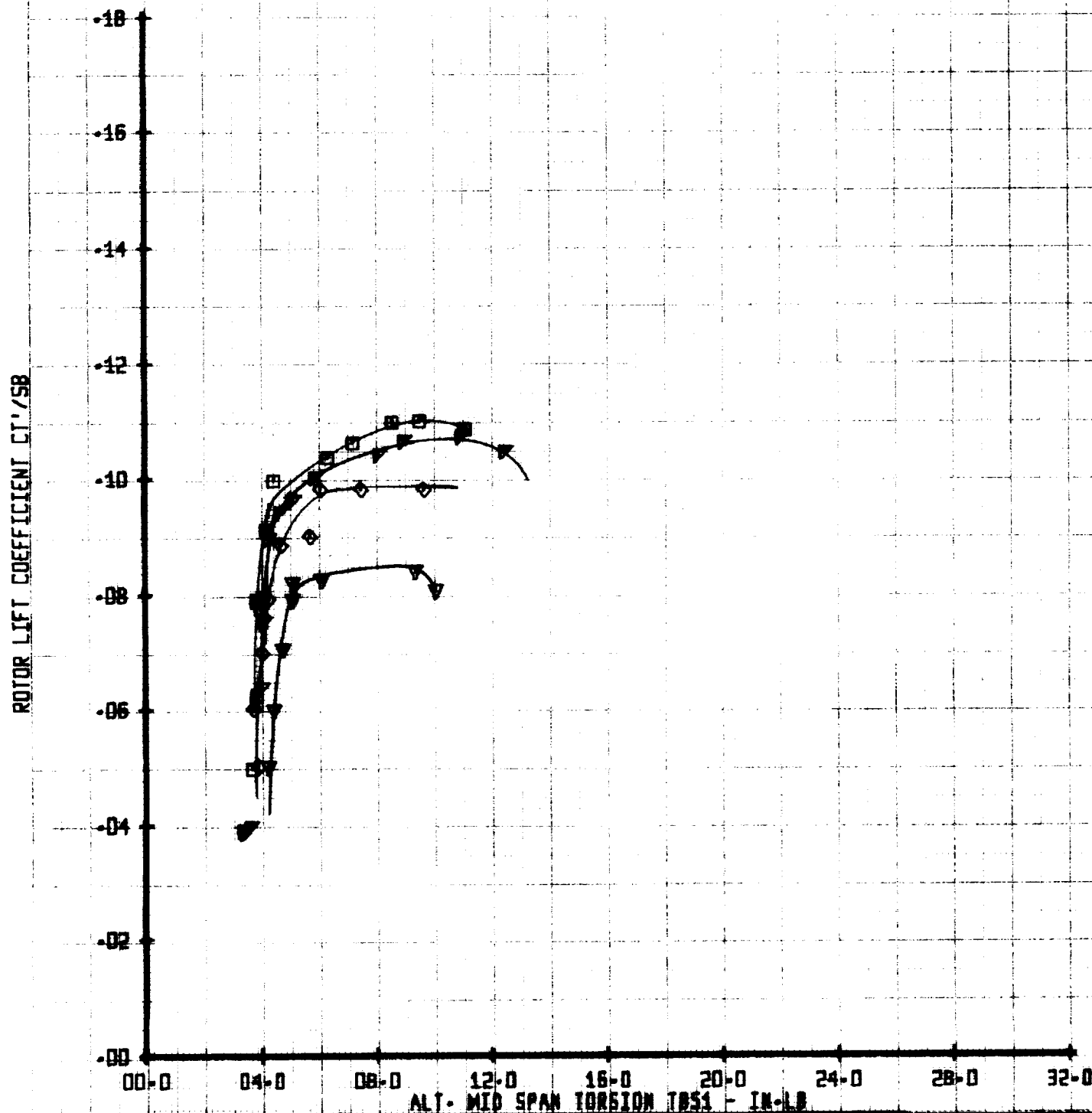


Figure A-67

LIFT-PROPULSIVE FORCE LIMIT TEST

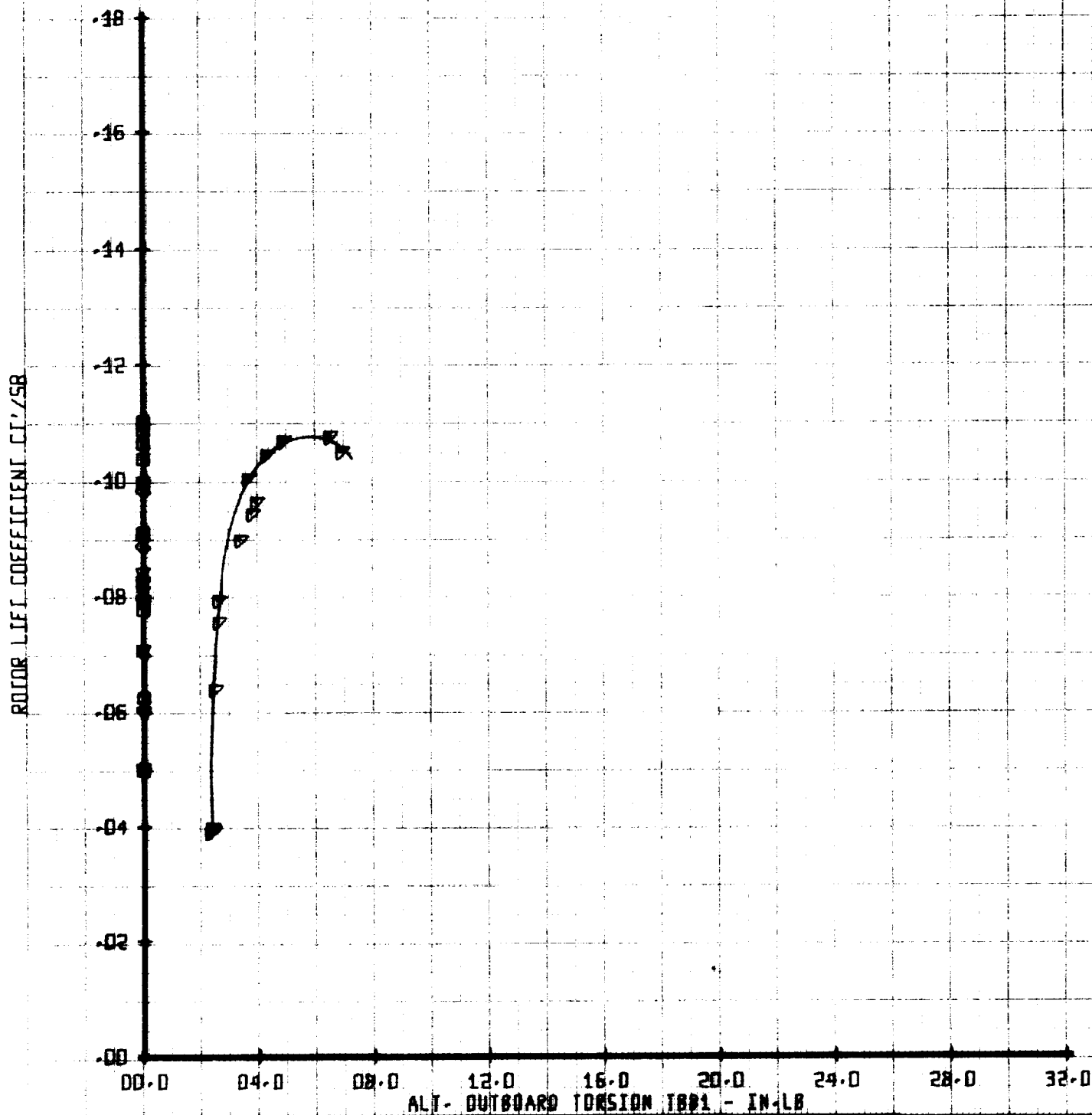
1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	32	.40	.01	248
△	30	.40	.05	248
▽	33	.40	.10	248
▲	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB81

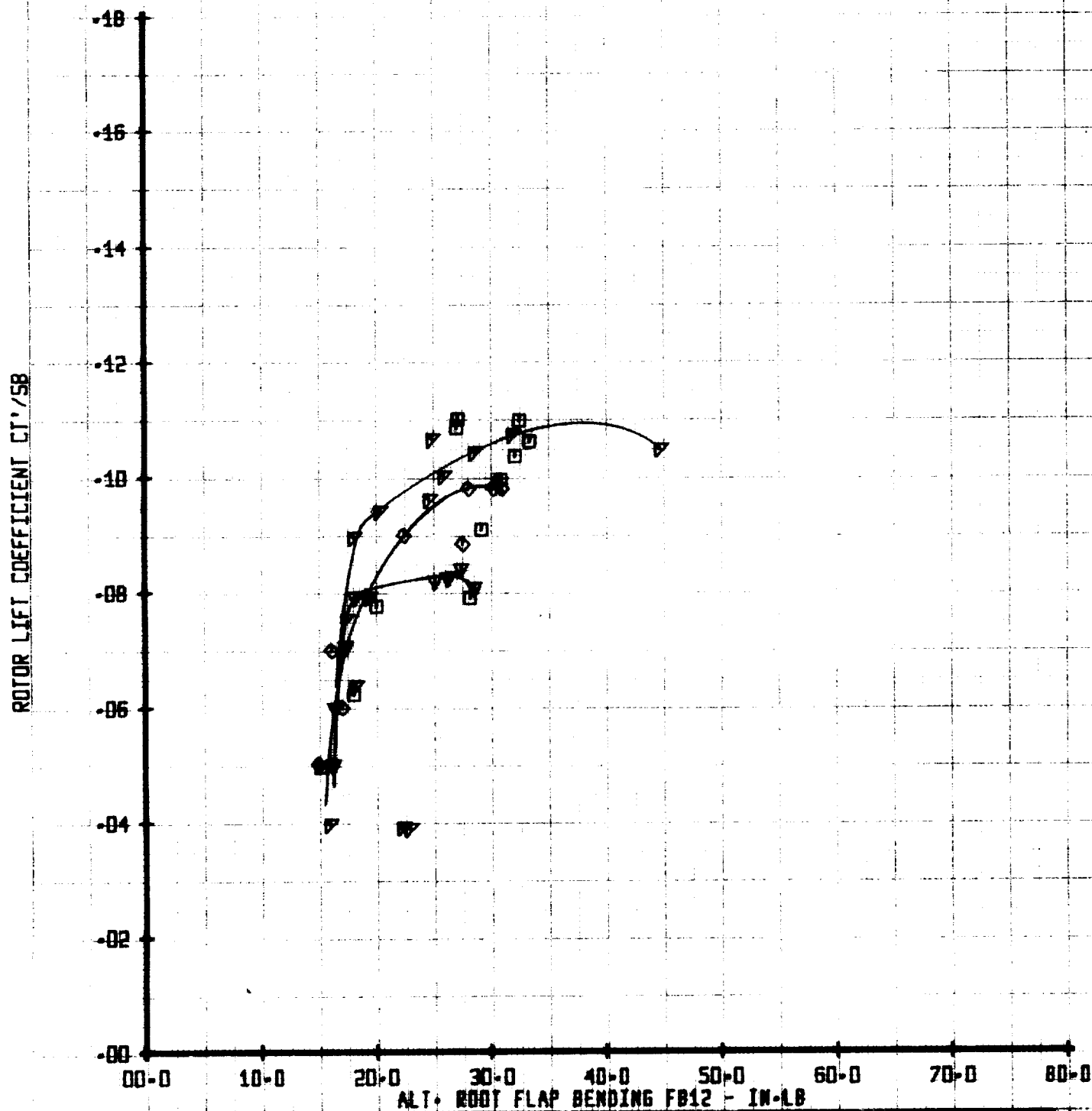


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	32	.40	.01	248
▽	30	.40	.05	248
◇	33	.40	.10	248
▼	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12



SET 3
BYWT 187

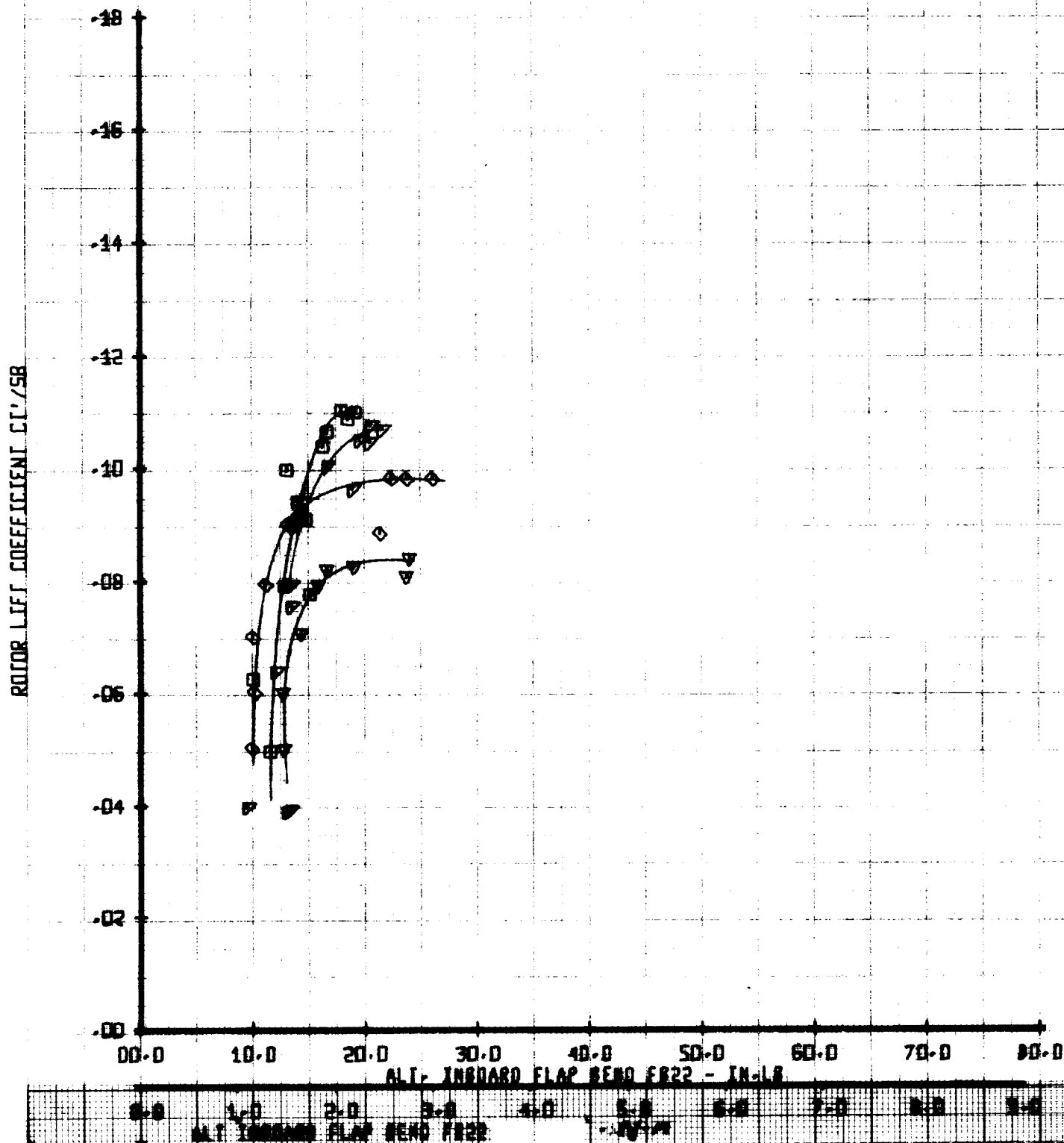
Figure A-69

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/DD258	YTUN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING INBOARD FLAP BENDING FB22



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND				
SYM	RUN	MU	X/00258	VTUN
○	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN FLAP BENDING FB48

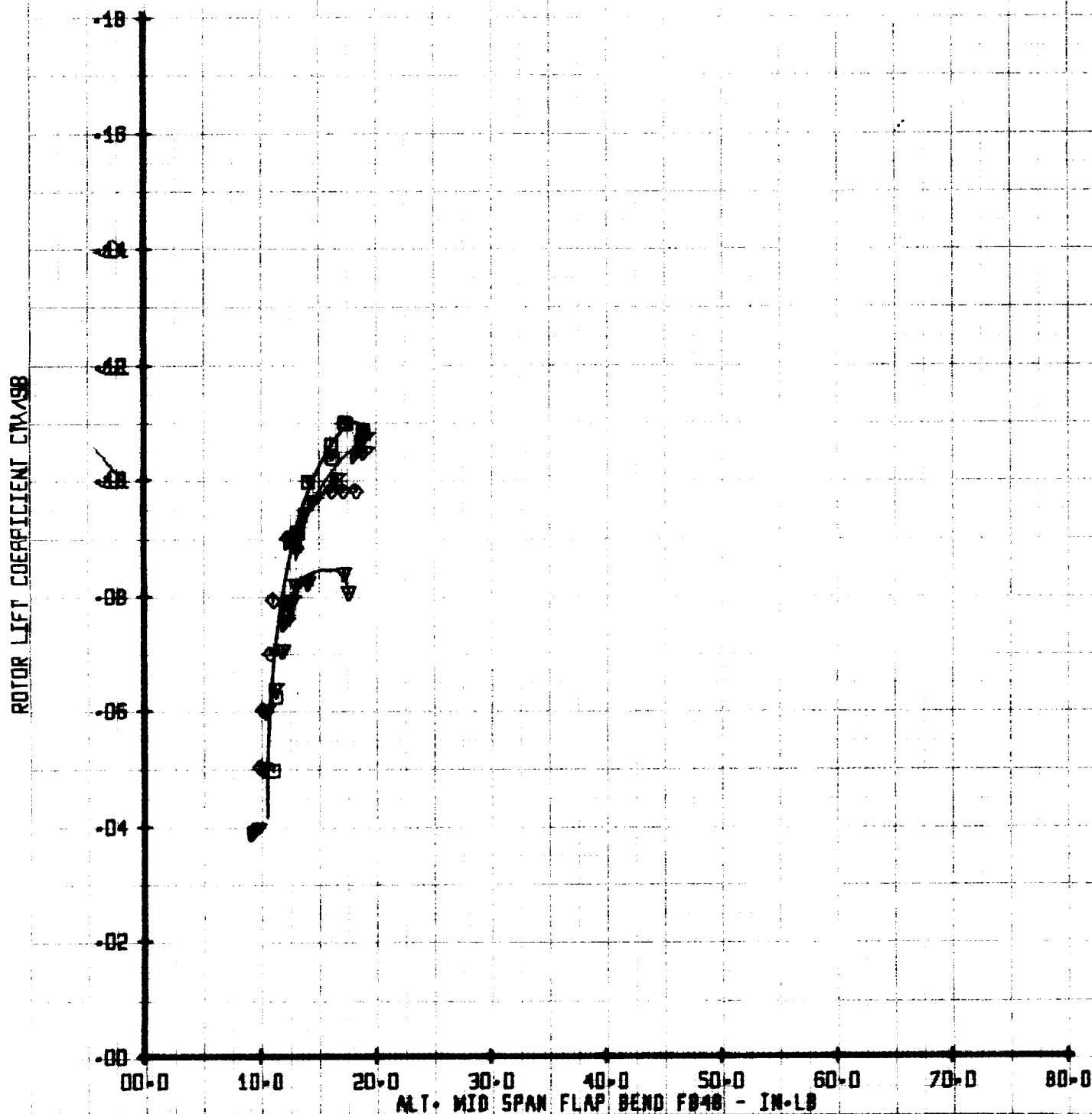


Figure A-71

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI	X/00258	VTUN
○	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD FLAP BENDING FB79

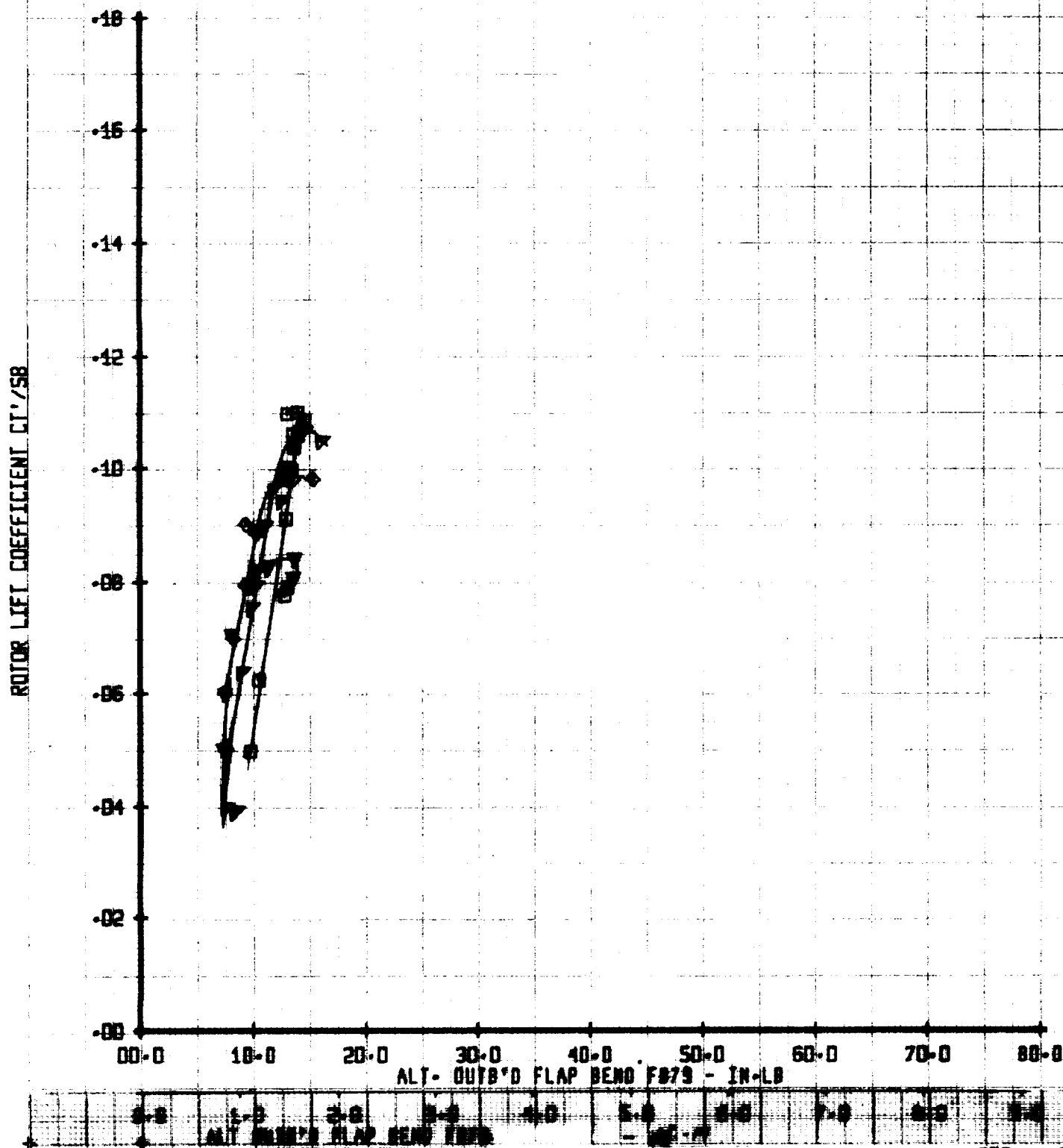


Figure A-72

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND				
SYM	RUN	MU'	X/00258	VTUN
□	32	.40	.01	248
▽	30	.40	.05	248
◇	33	.40	.10	248
▼	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

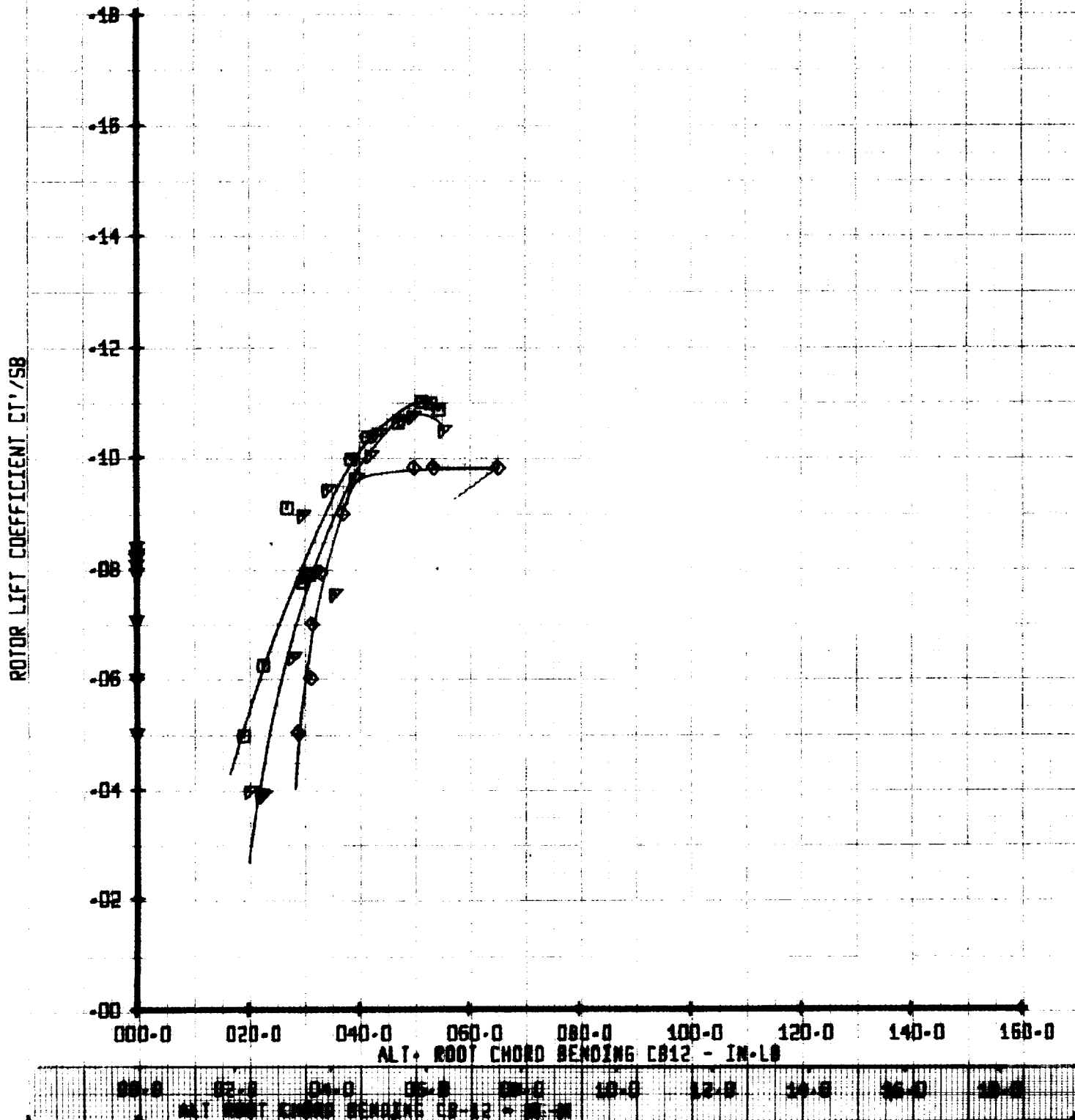


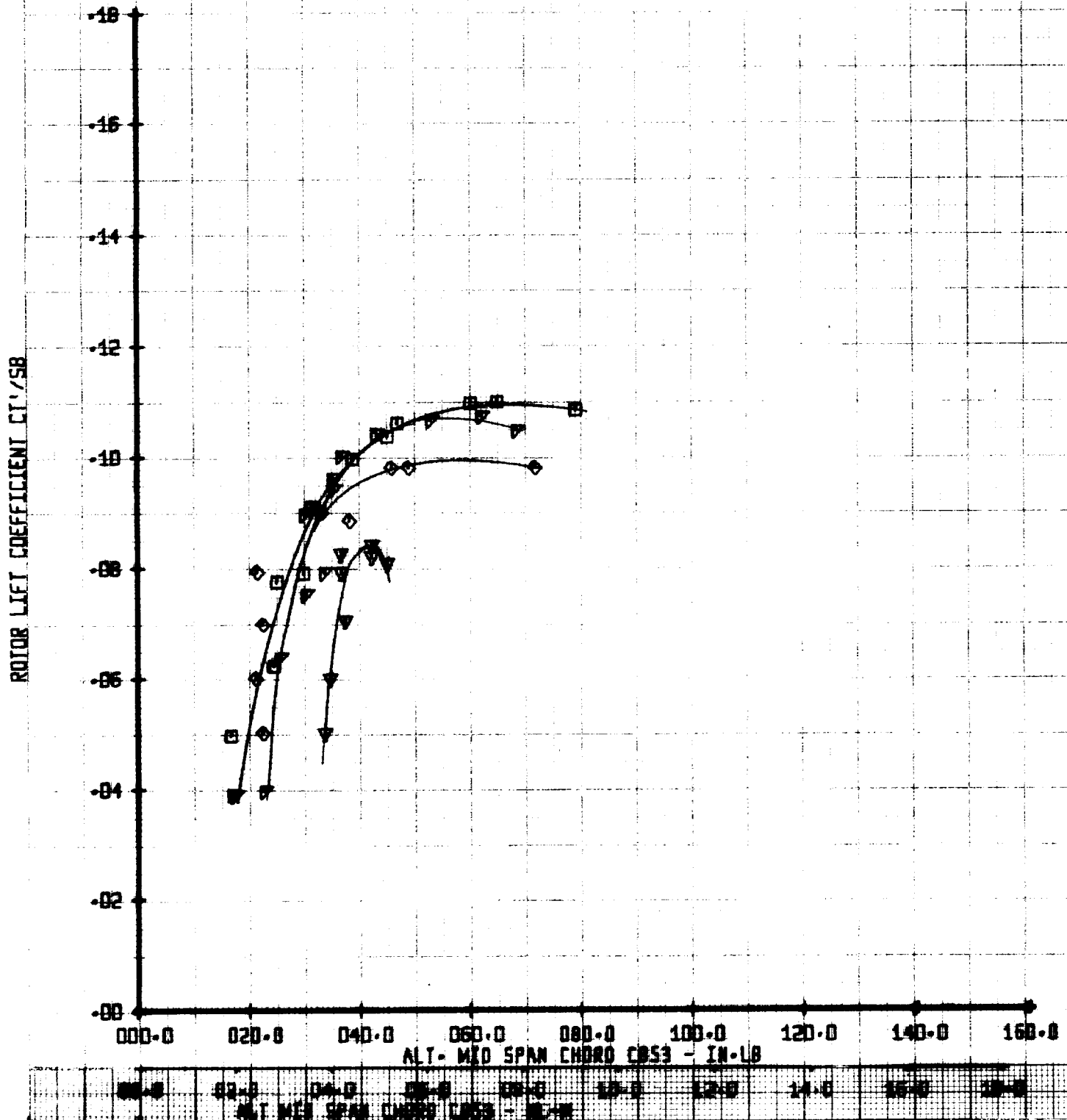
Figure A-73

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML	X/00258	VTUN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN CHORD CB53



LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	YTUN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.48	.18	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
CONING ANGLE

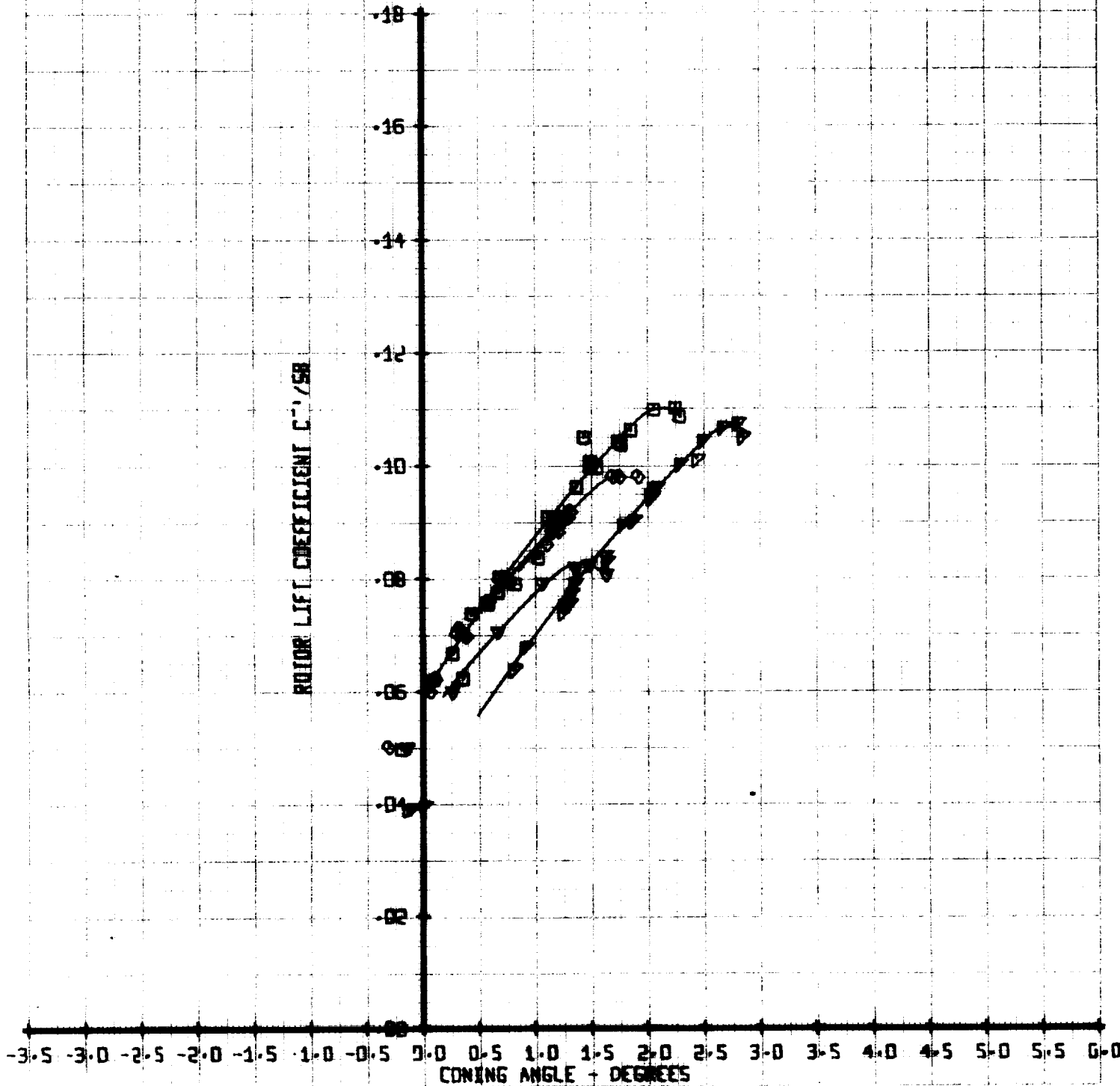
ROTOR LIFT COEFFICIENT C_L/58

Figure A-75

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	Y/TIN
□	32	.40	.01	248
▤	30	.40	.05	248
◊	33	.40	.10	248
▼	34	.40	.20	248

ROTOR LIFT COEFFICIENT

VERSUS

1ST HARMONIC LONGITUDINAL FLAPPING A1

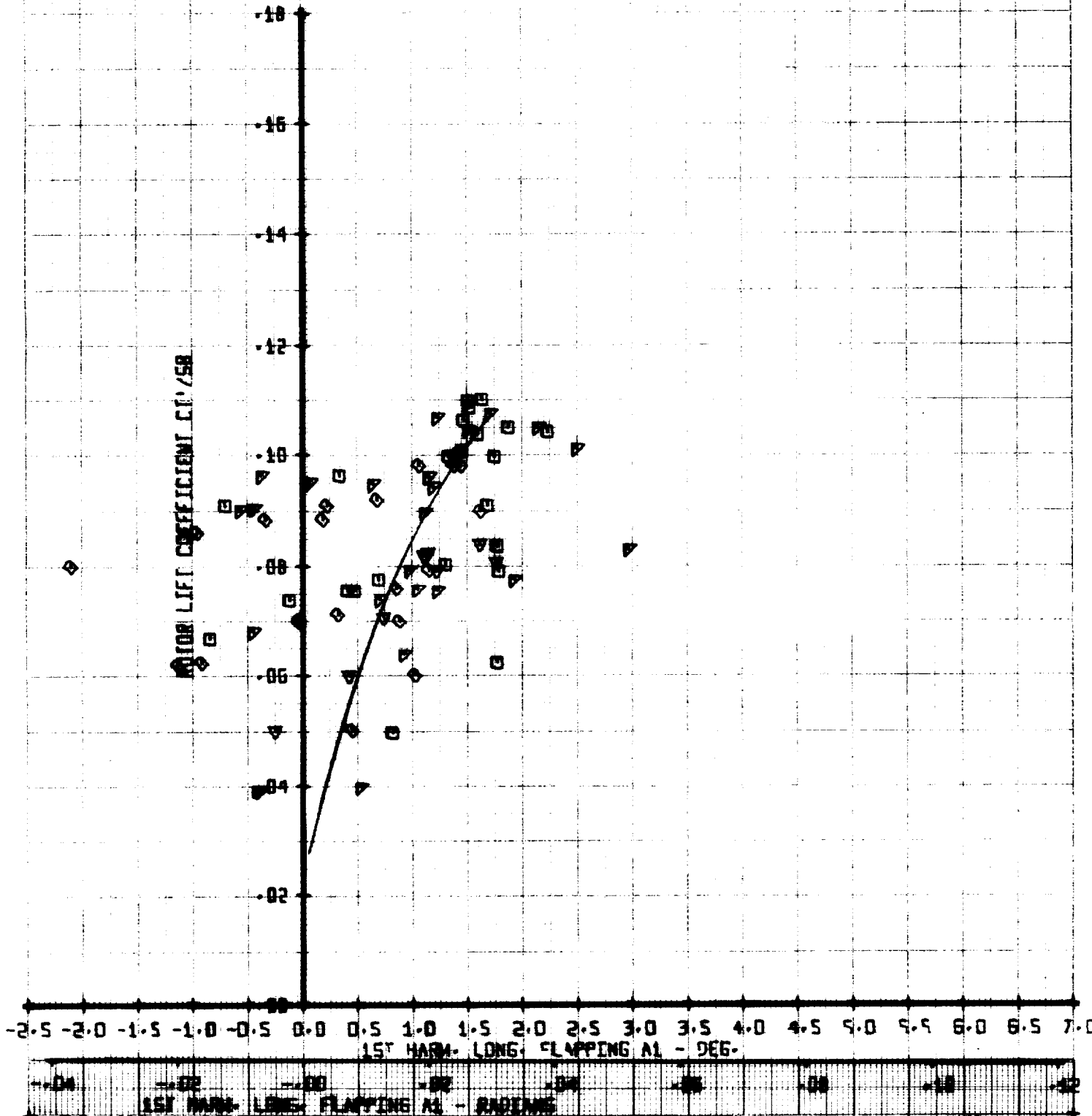


Figure A-76

LIFT-PROPULSIVE FORCE LIMIT TEST

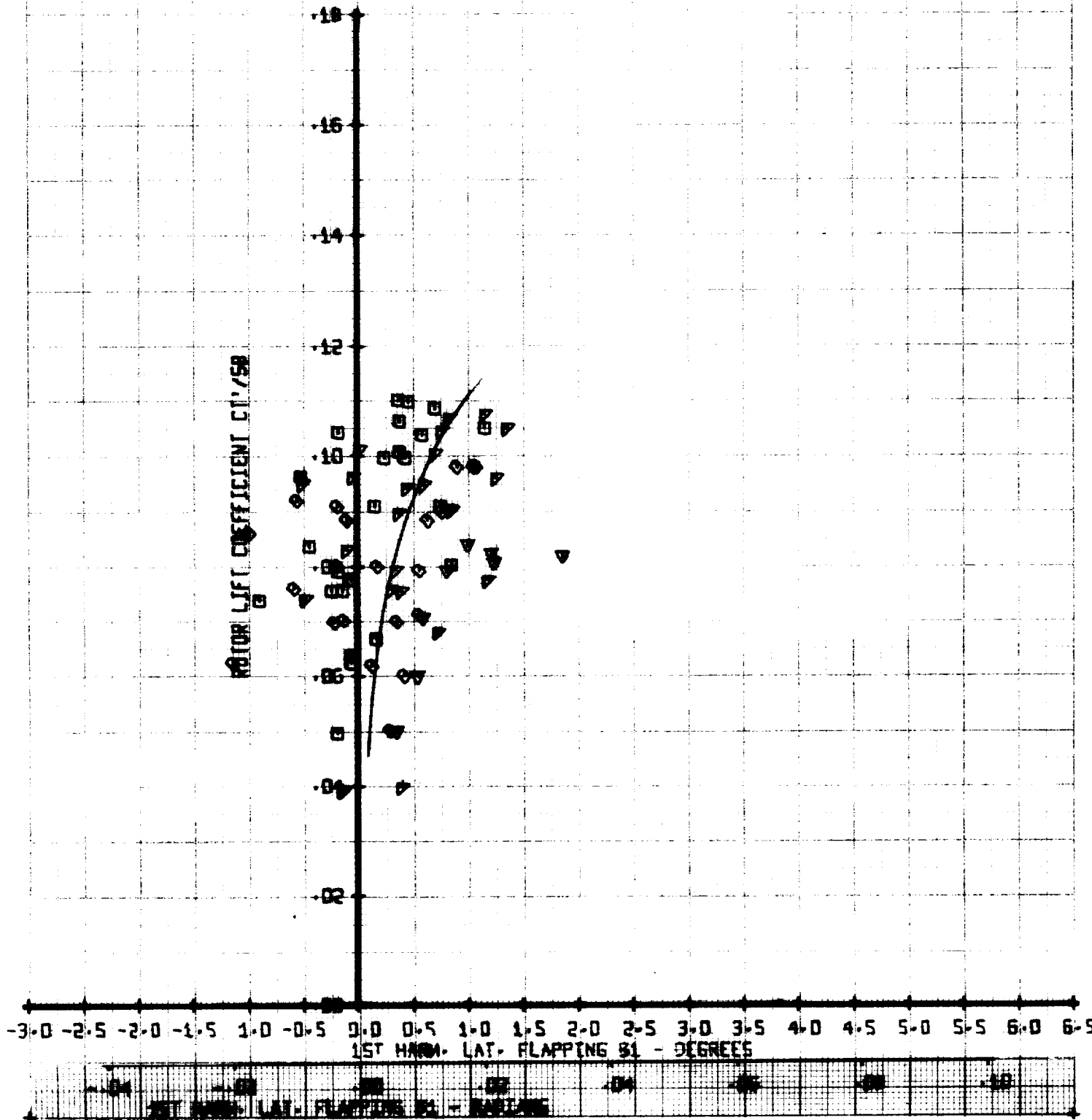
1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	Y/TUN
□	32	.40	.01	248
▲	30	.40	.05	248
◆	33	.40	.10	248
▼	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1



SET 3
BYWT 187

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU*	X/DD258	YTUN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE

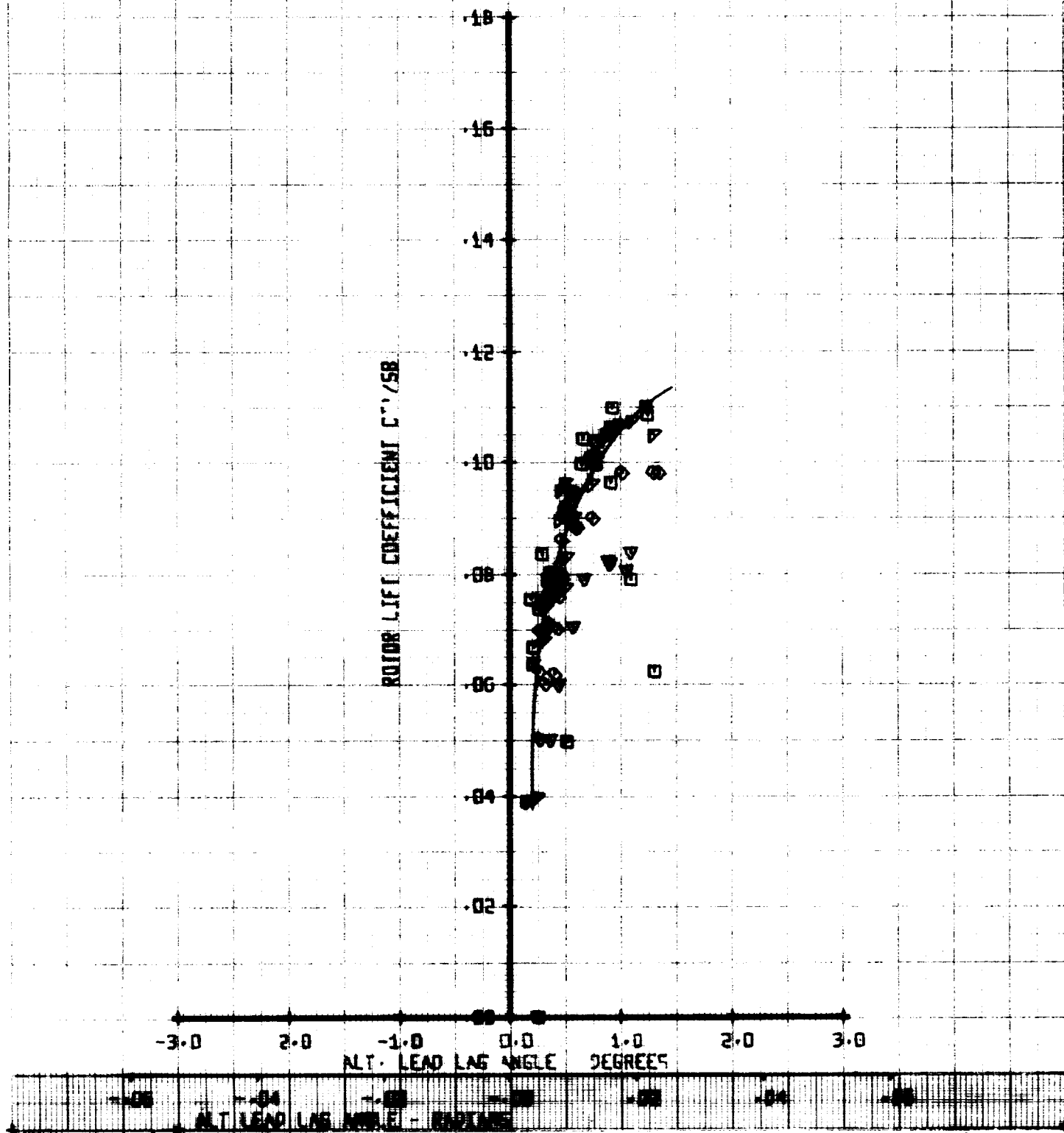


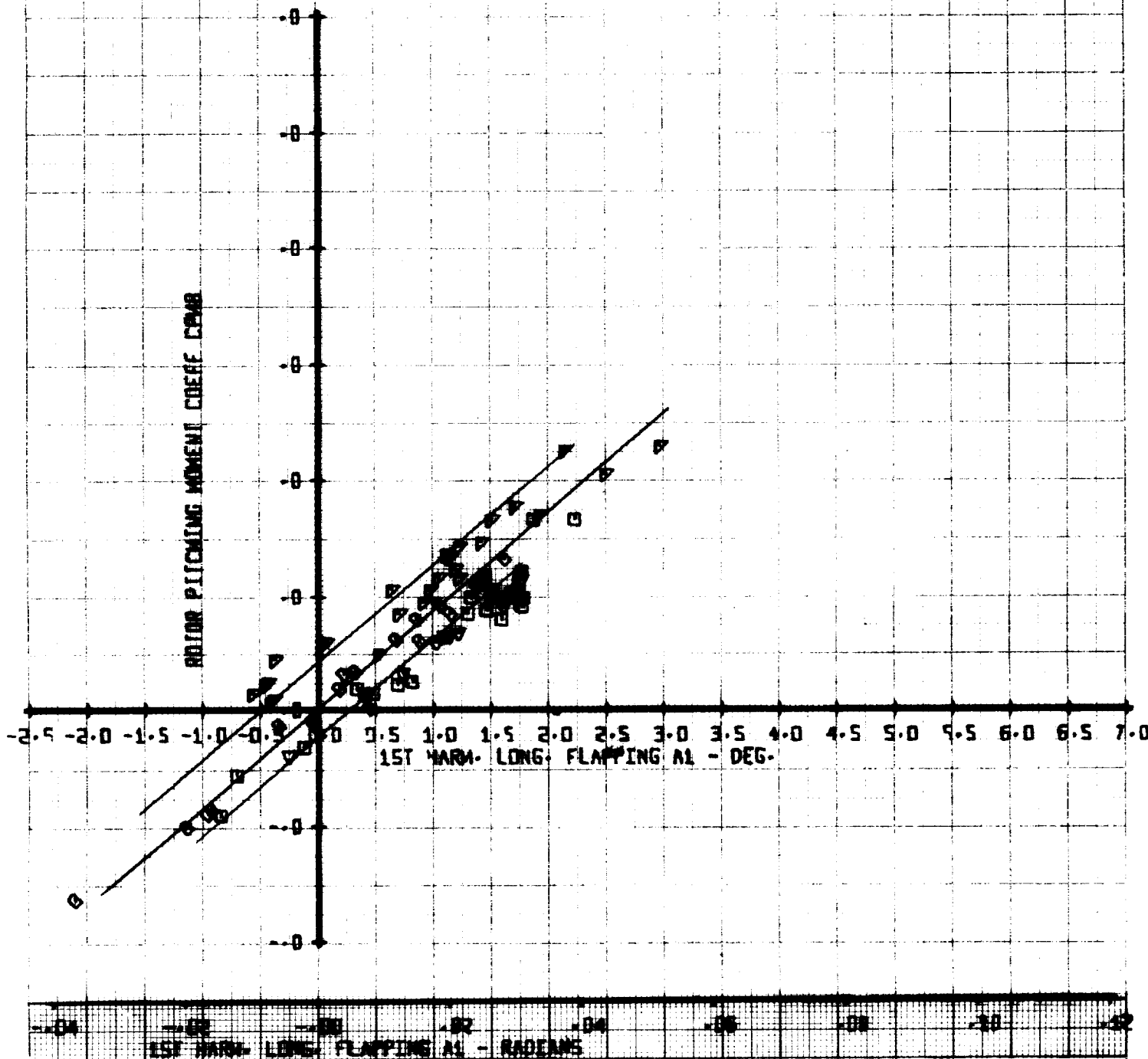
Figure A-78

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	Y/TIN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR PITCHING MOMENT COEFFICIENT
 VERSUS
 1ST HARMONIC LONGITUDINAL FLAPPING A1



LIFT-PROPULSIVE FORCE LIMIT TEST

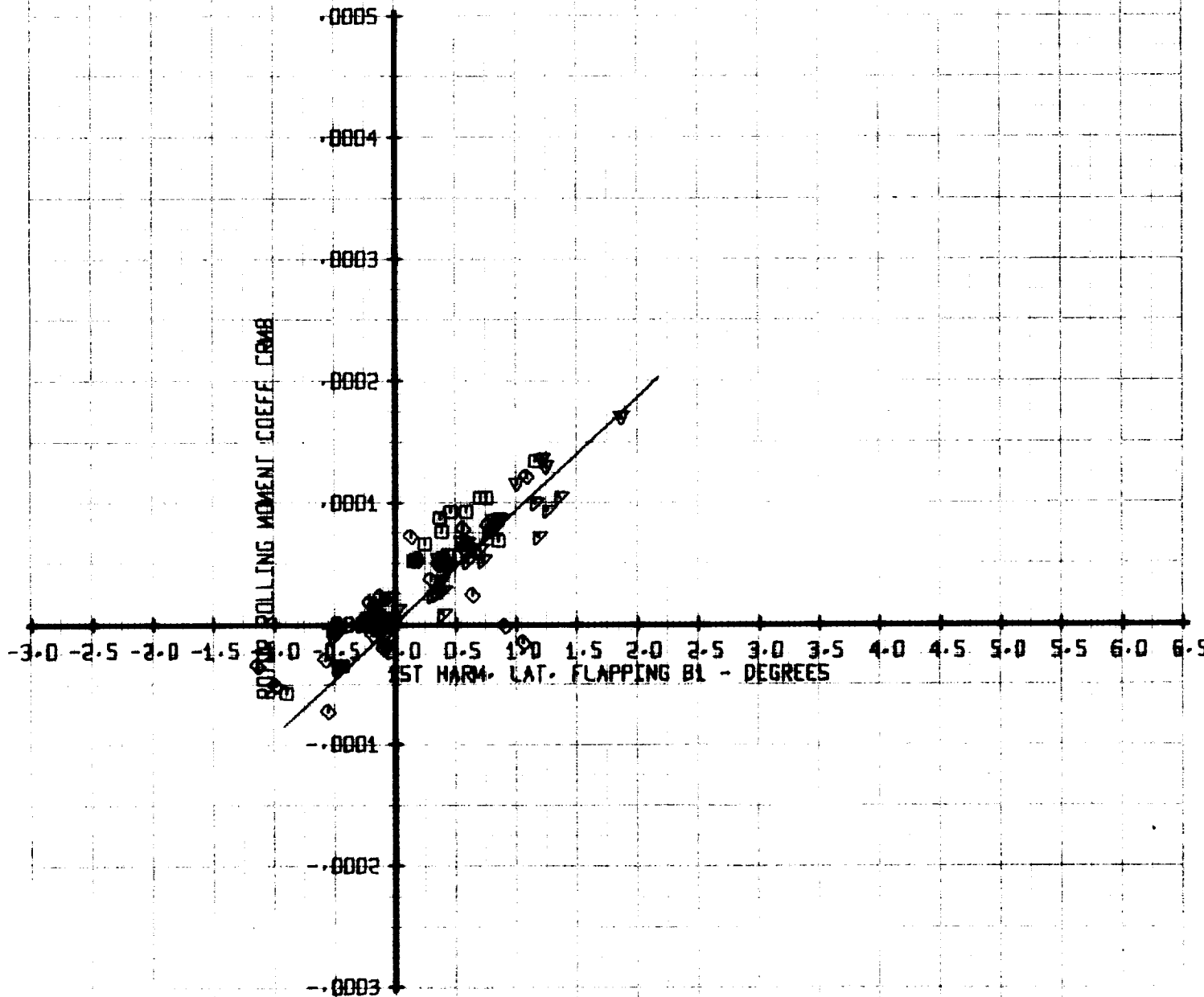
1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	32	.40	.01	248
△	30	.40	.05	248
◇	33	.40	.10	248
▽	34	.40	.20	248

ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1



1ST HARM. LAT. FLAPPING B1 - DEGREES

Figure A-80

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DD258	VTUN
□	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PROPULSIVE FORCE COEFFICIENT

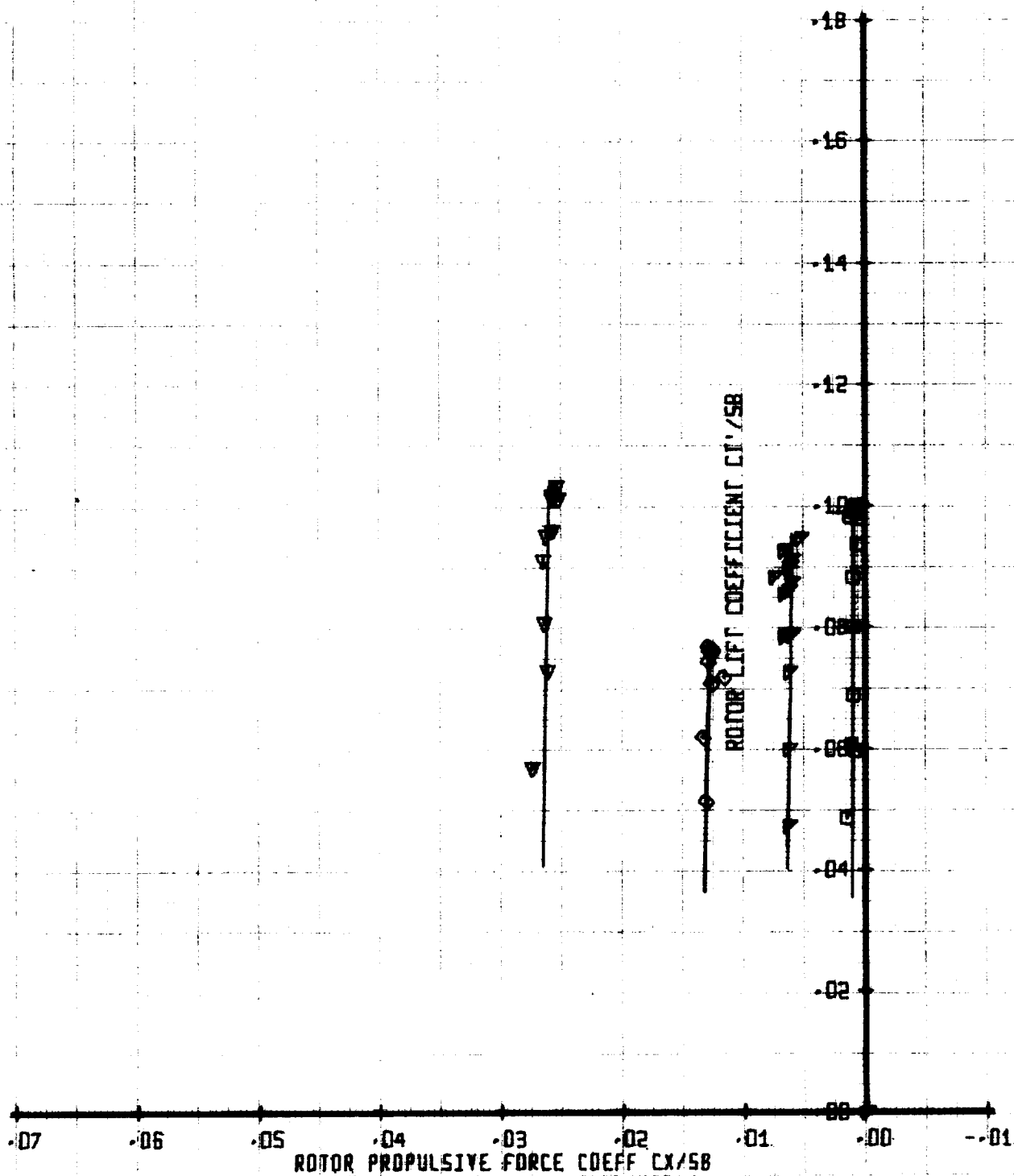


Figure A-81

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
○	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK

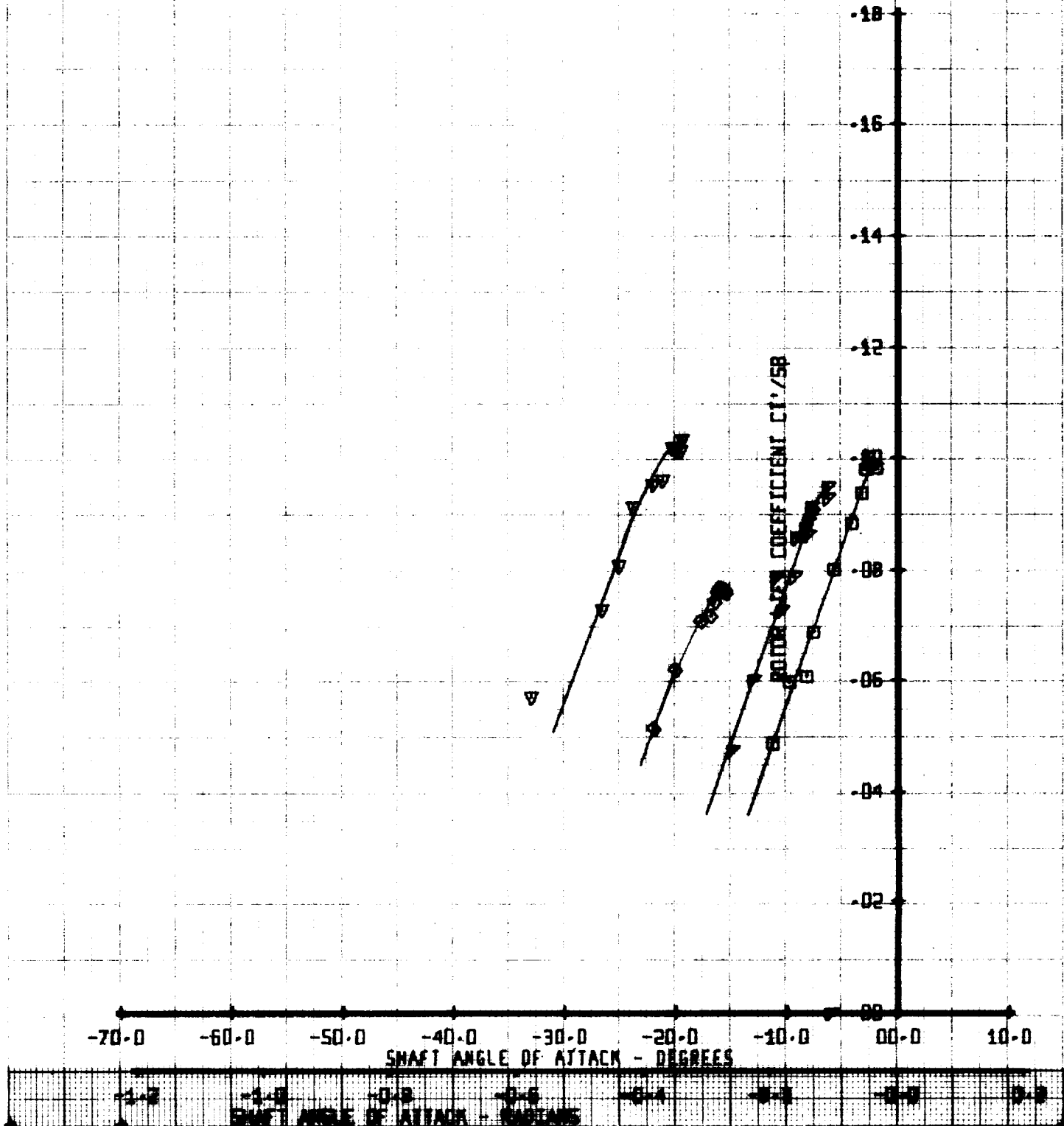


Figure A-82

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DD258	VTUN
□	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH

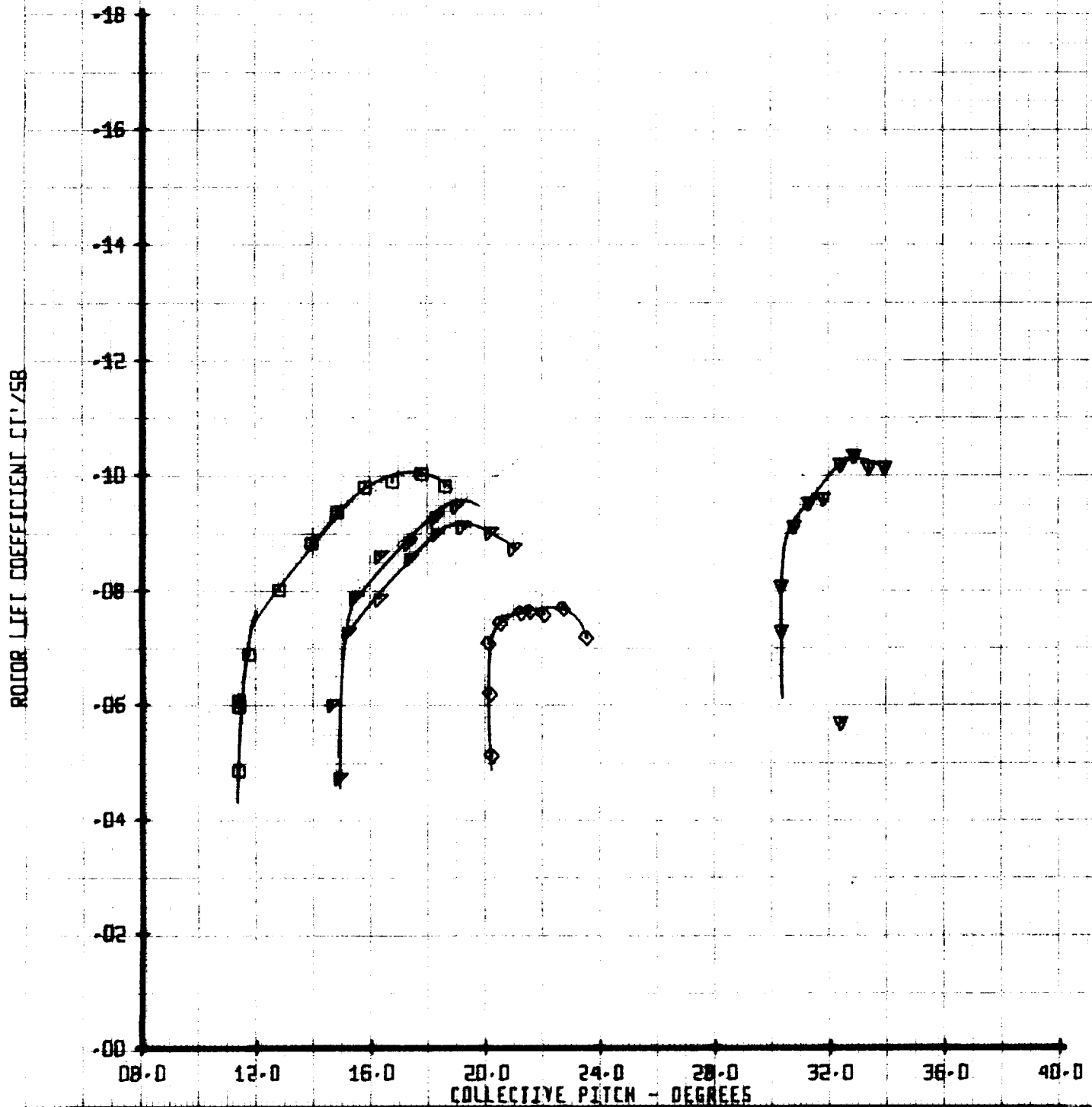


Figure A-83

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'	X/00258	VTUN
□	35	.45	.01	279
▽	36	.45	.05	279
◇	37	.45	.10	279
△	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
LONGITUDINAL CYCLIC

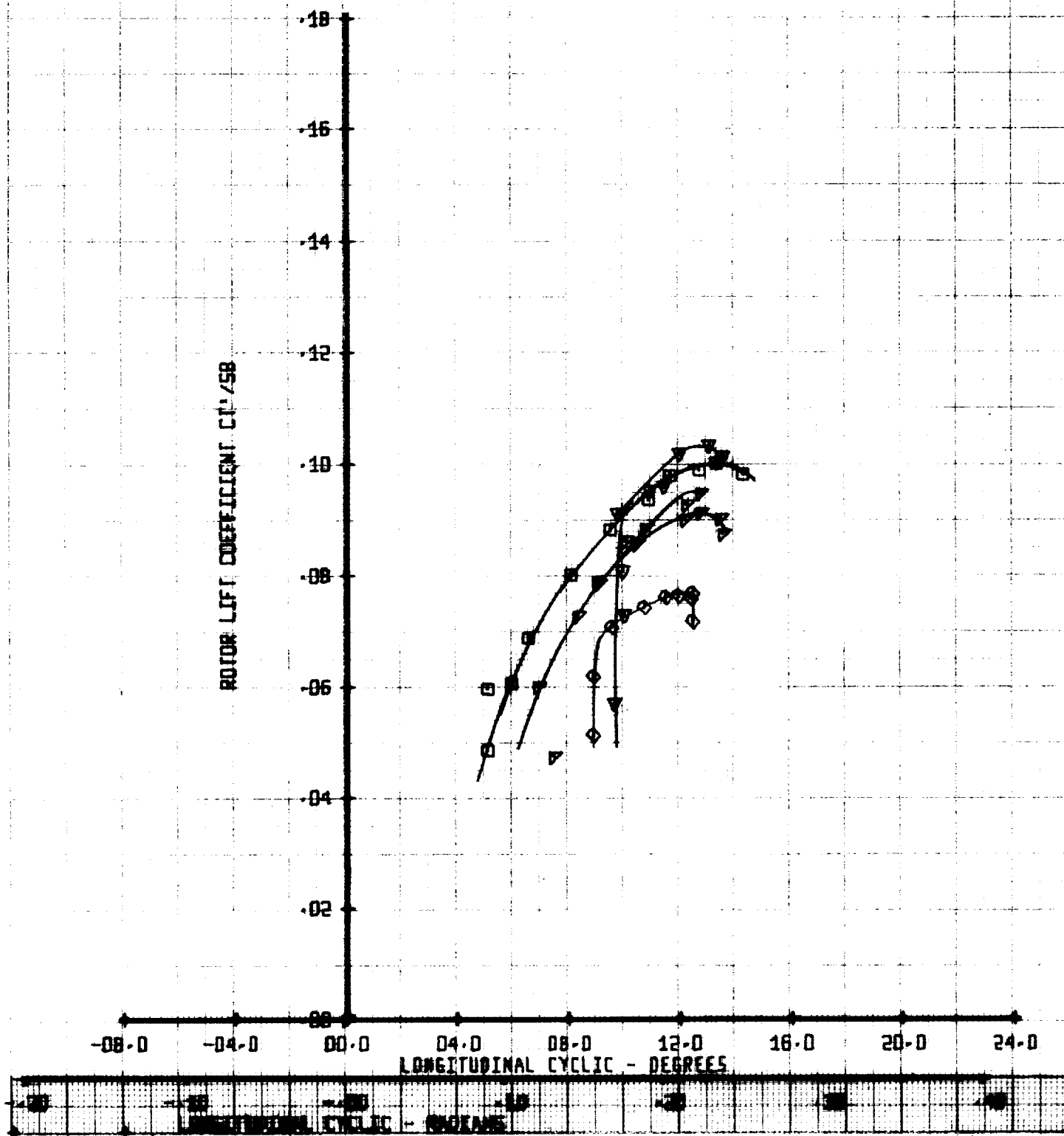


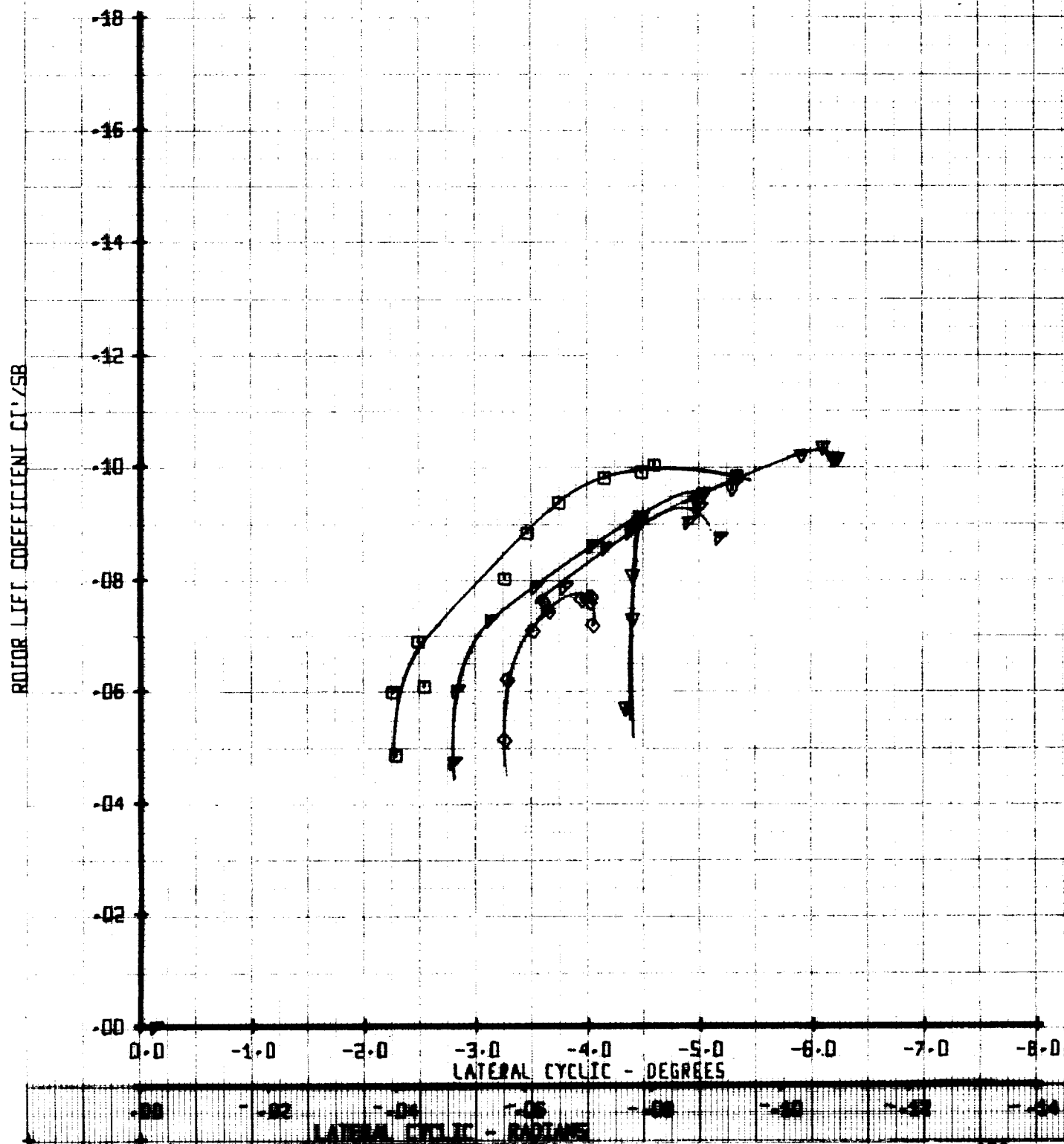
Figure A-84

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
LATERAL CYCLIC

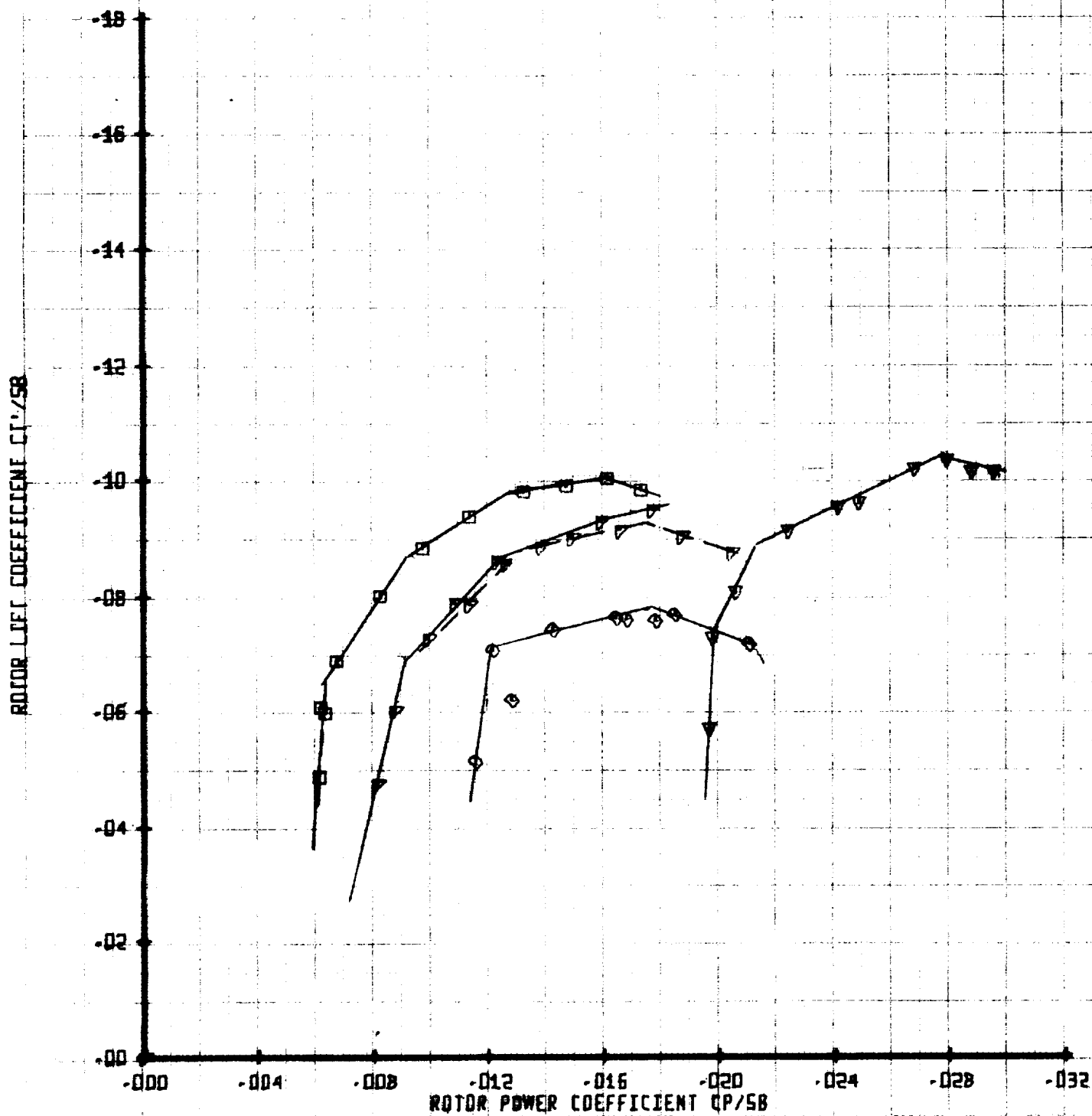


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'	X/00258	VIUN
□	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

• ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MA'	X/100258	VTW
□	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT

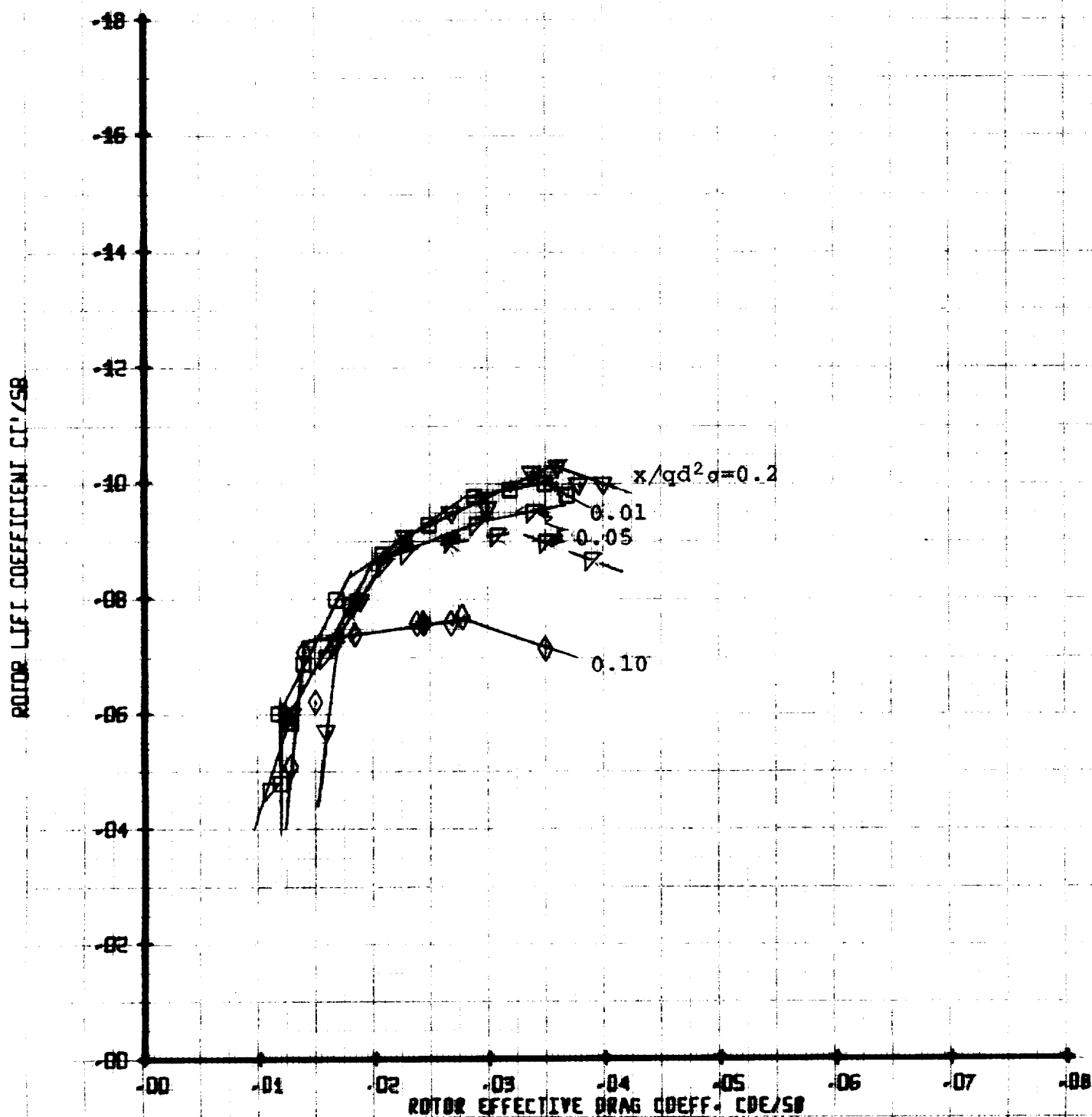


Figure A-87

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU' X/00258	VTUN
○	35	.45	.01
□	36	.45	.05
△	37	.45	.10
▽	38	.45	.20

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

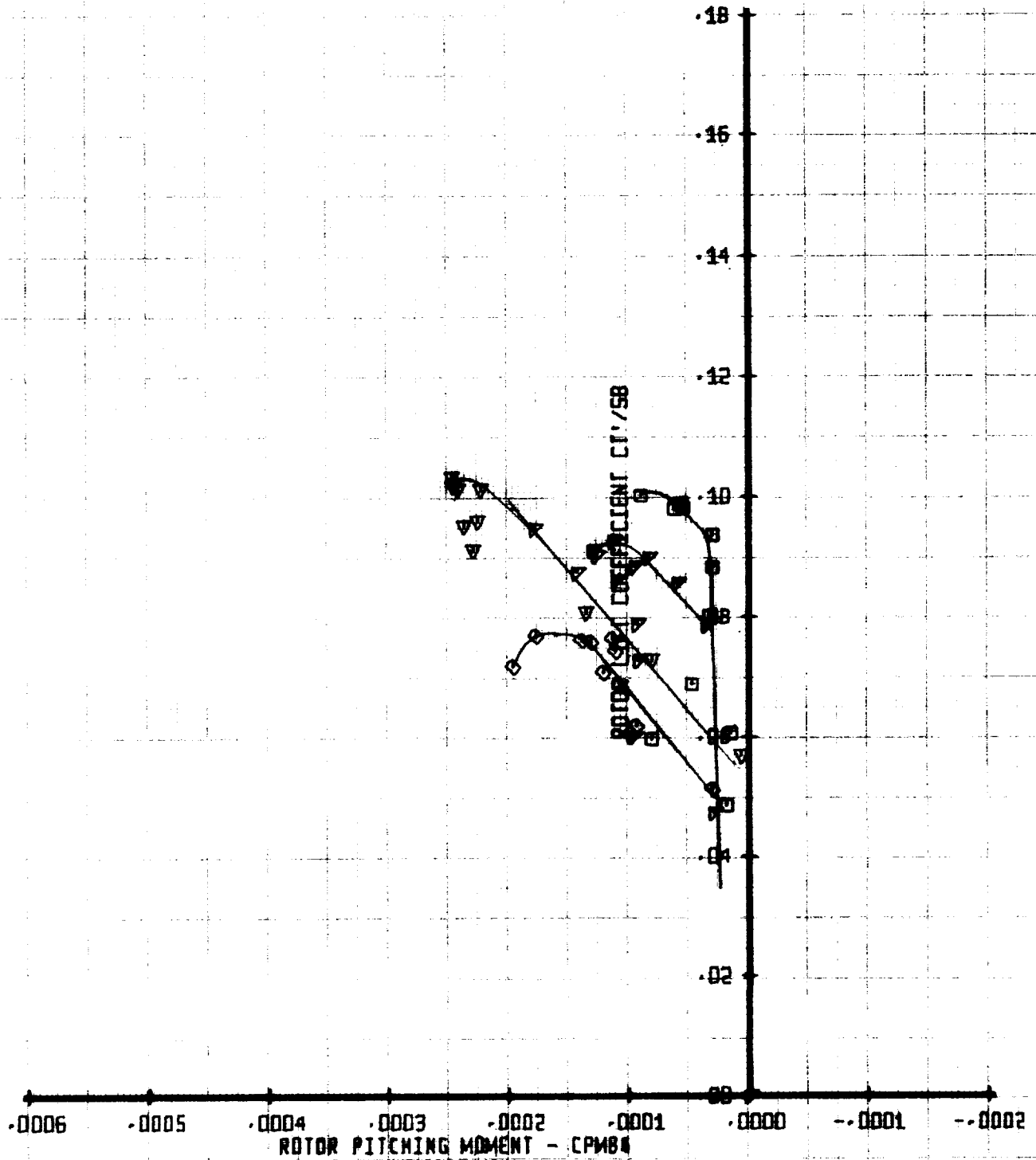


Figure A-88

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DD258	VTUN
○	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT

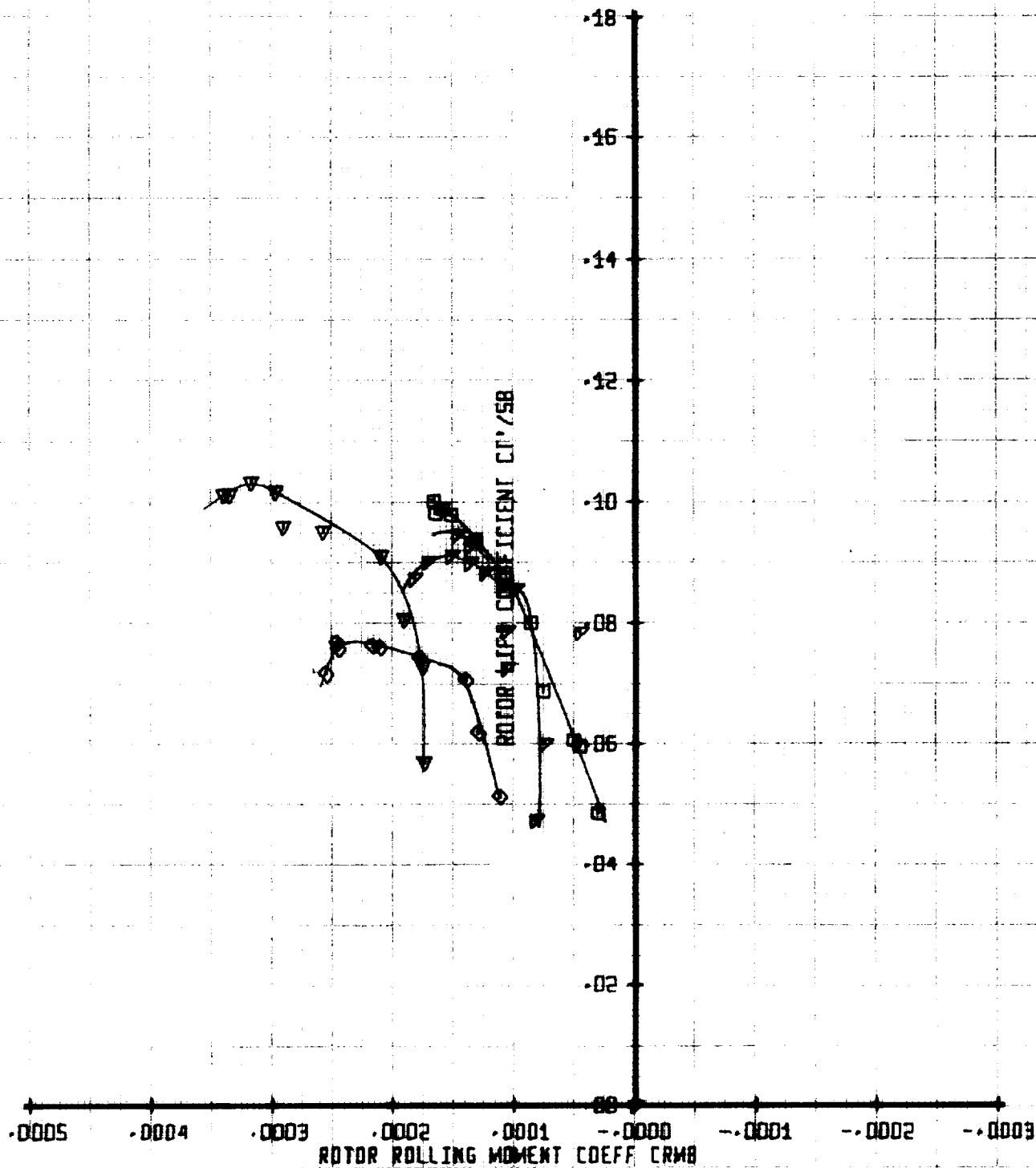


Figure A-89

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI' X/00258	VTIN
□	35	.45	.01
△	36	.45	.05
◇	37	.45	.10
▽	38	.45	.20

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT

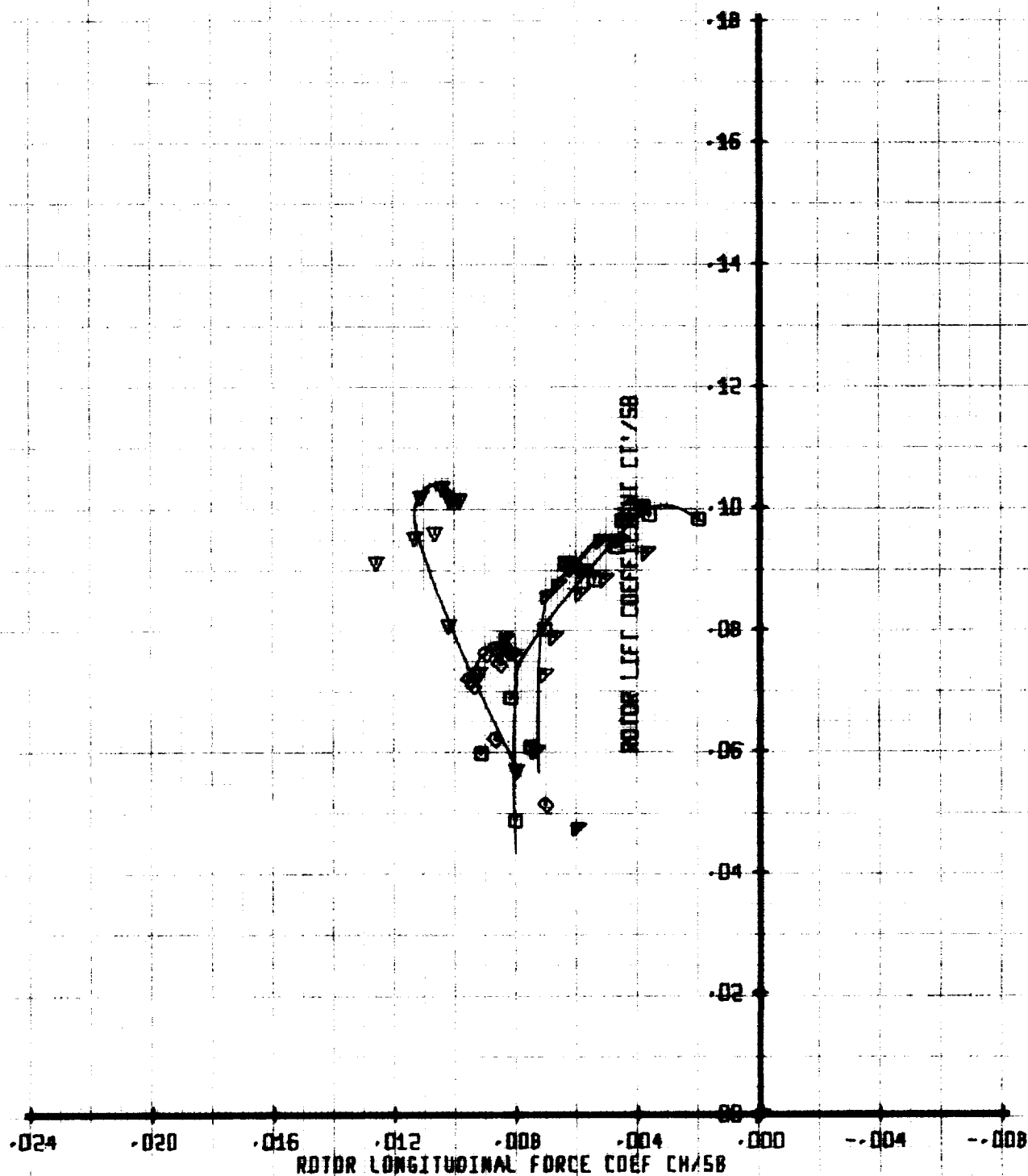


Figure A-90

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DB2SB	VTIN
□	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT

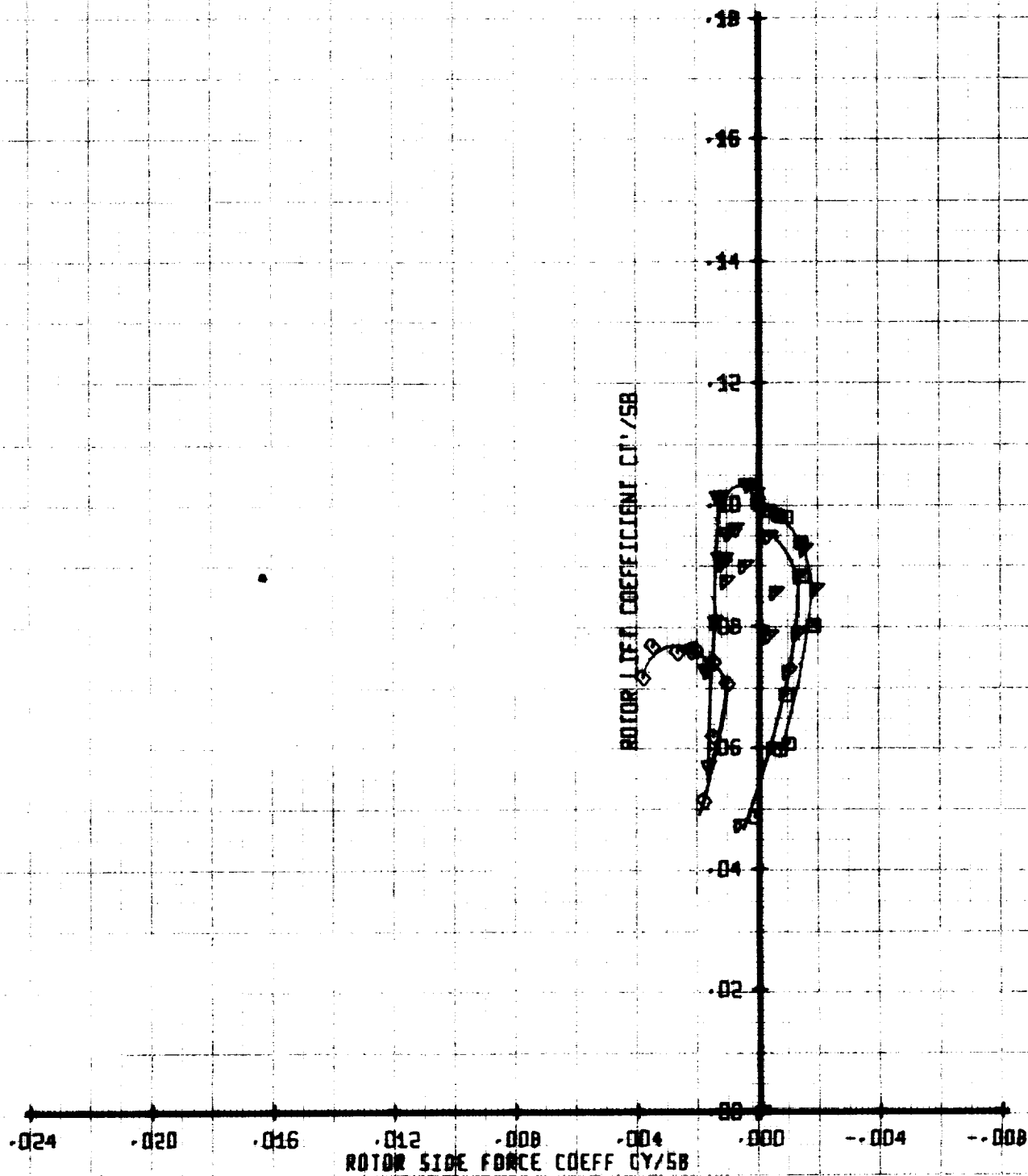


Figure A-91

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 LIFT LIMIT TESTING

SYM	RUN	MU	X/00250	VTUN
□	35	.45	.01	279
▽	36	.45	.05	279
◇	37	.45	.10	279
▼	38	.45	.20	279

ROTOR LIFT COEFFICIENT
 VERSUS
 ALTERNATING ROOT TORSION TB 12

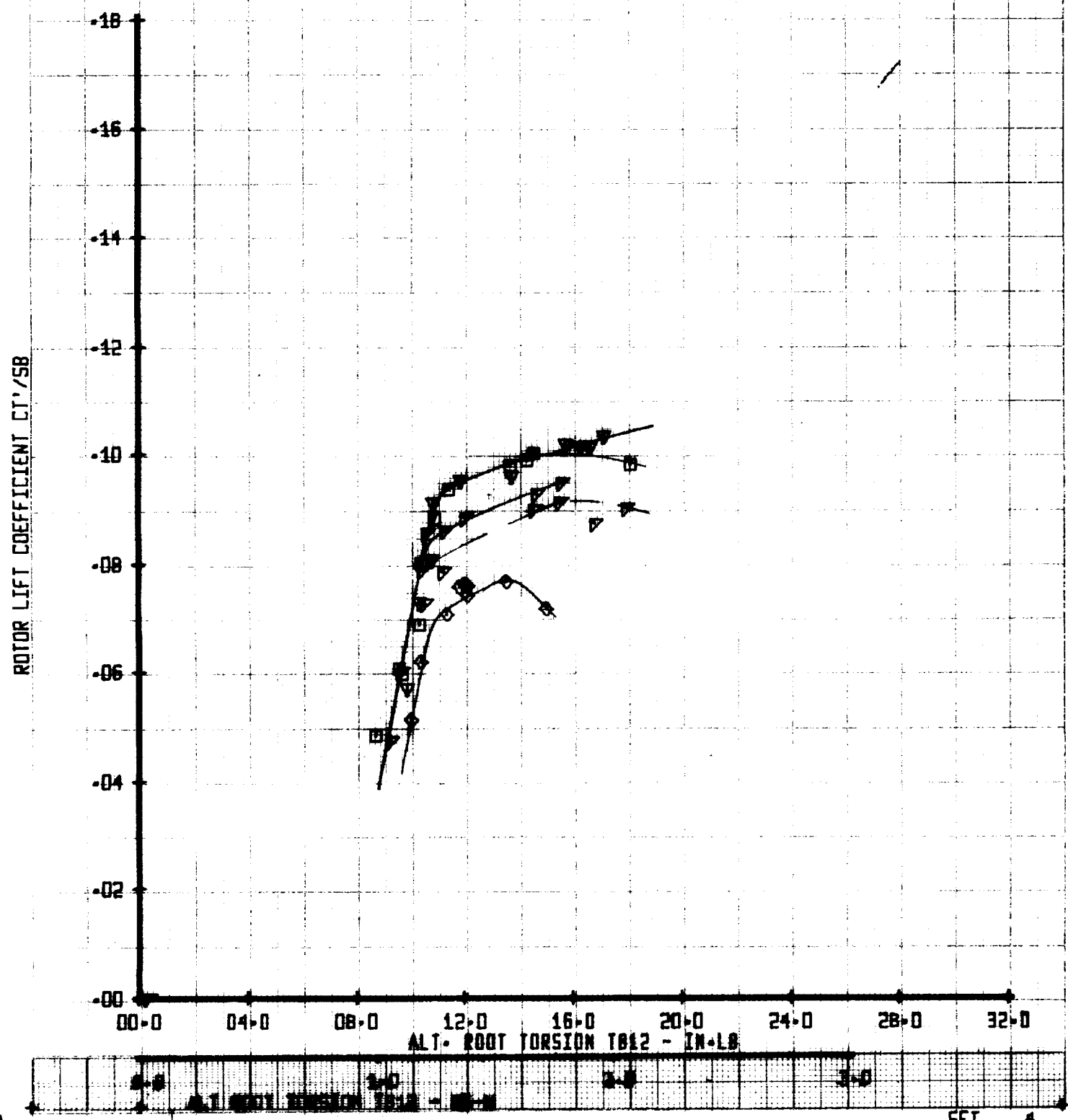


Figure A-92

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/DD2SB	VTUN
□	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING INBOARD TORSION TB20

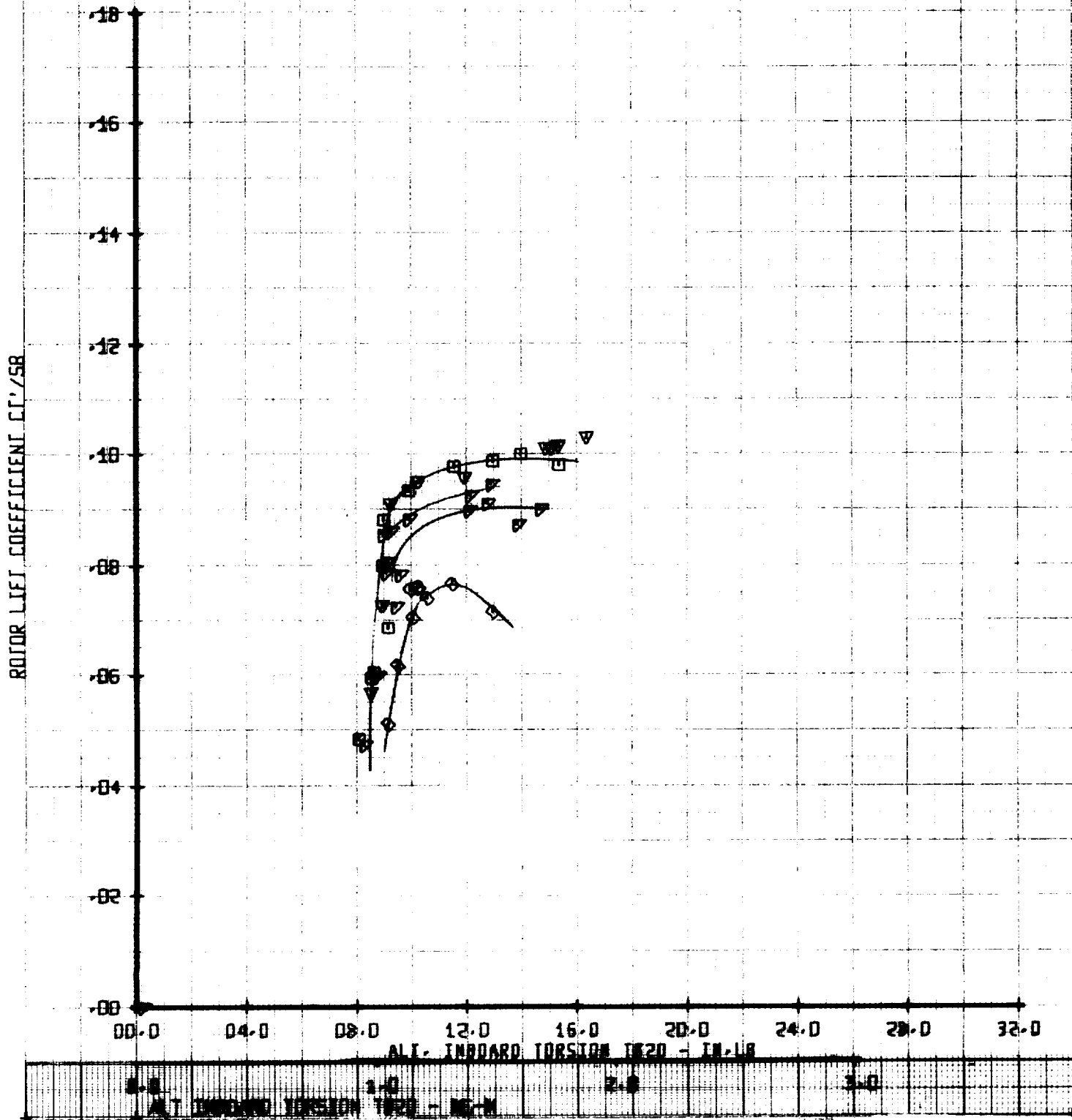


Figure A-93

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	35	.45	.01	279
◇	36	.45	.05	279
△	37	.45	.10	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB51

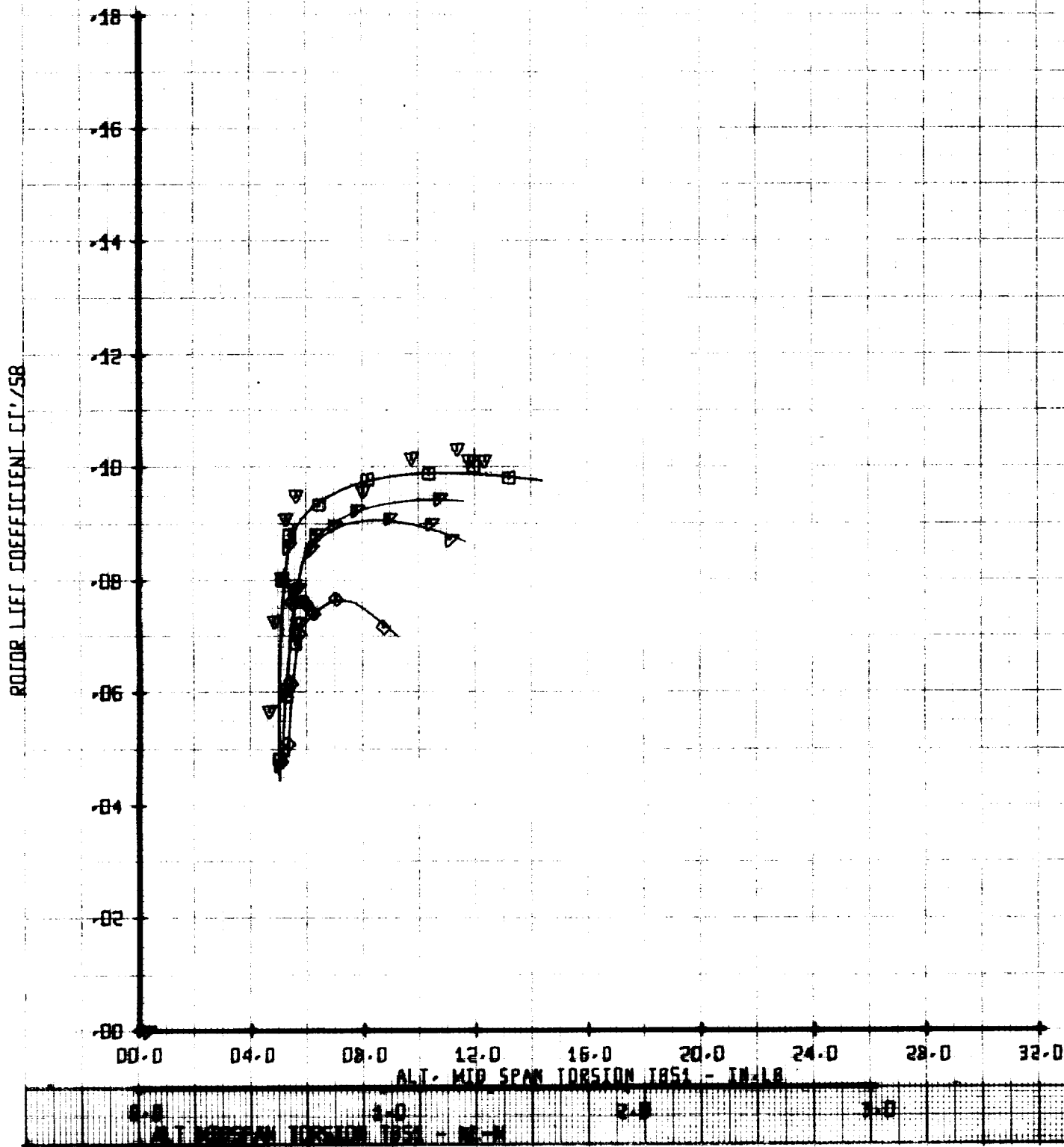


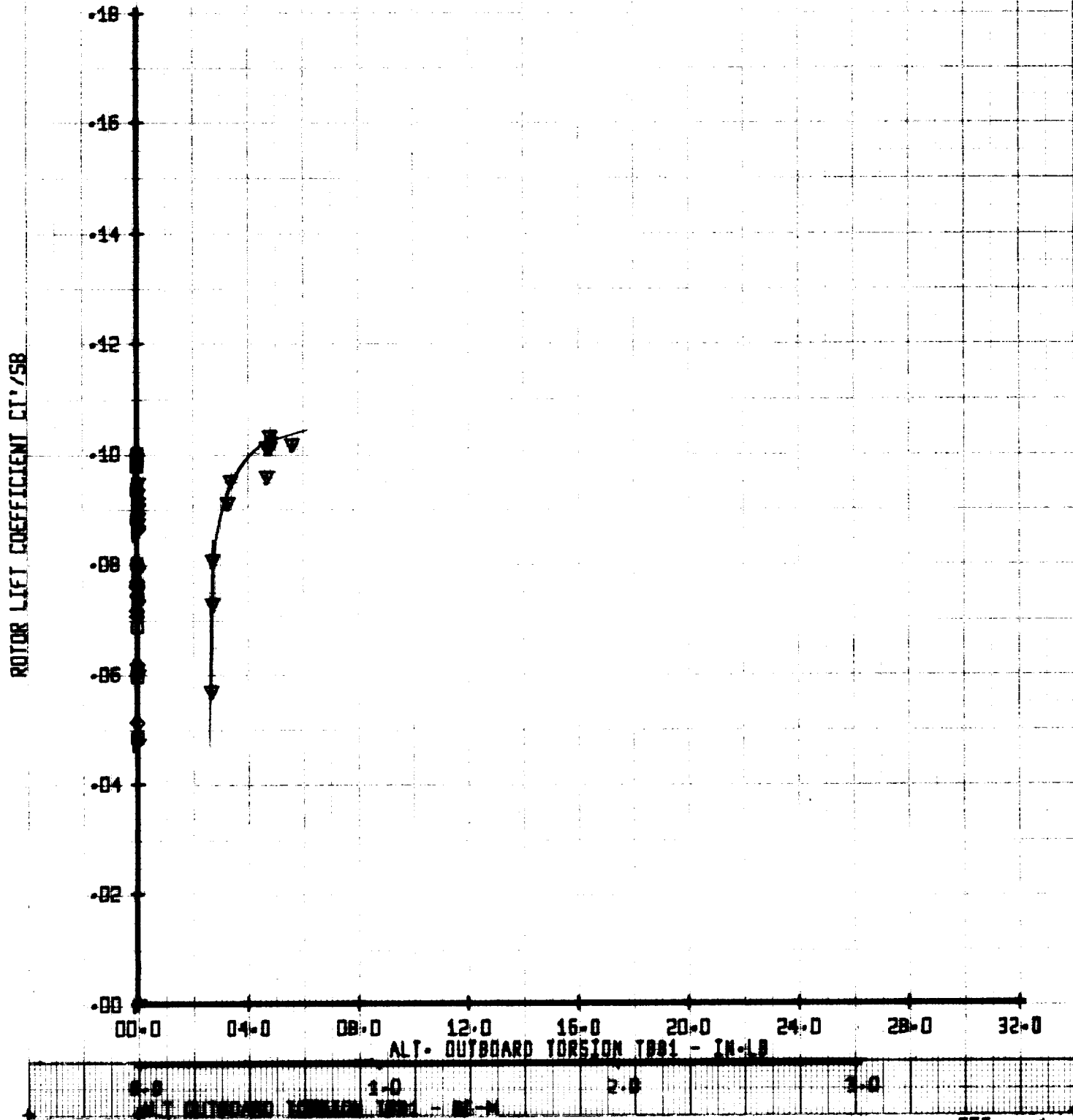
Figure A-94

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

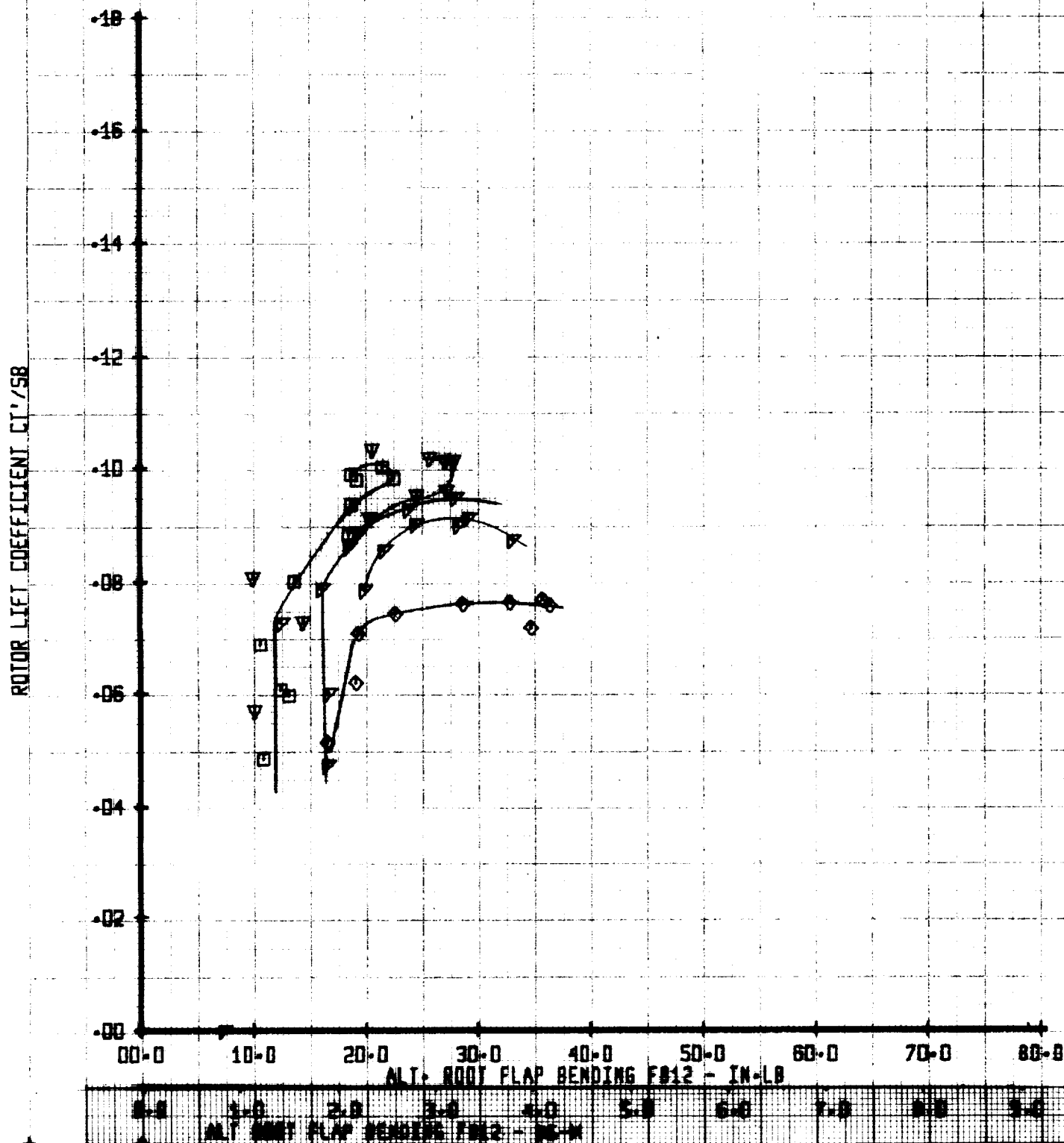
ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB81



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MI	X/00258	VTUN
□	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML' X/0025B	VIUN
○	35	.45	.01
△	36	.45	.05
◇	37	.45	.10
▽	38	.45	.20

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING INBOARD FLAP BENDING FB22

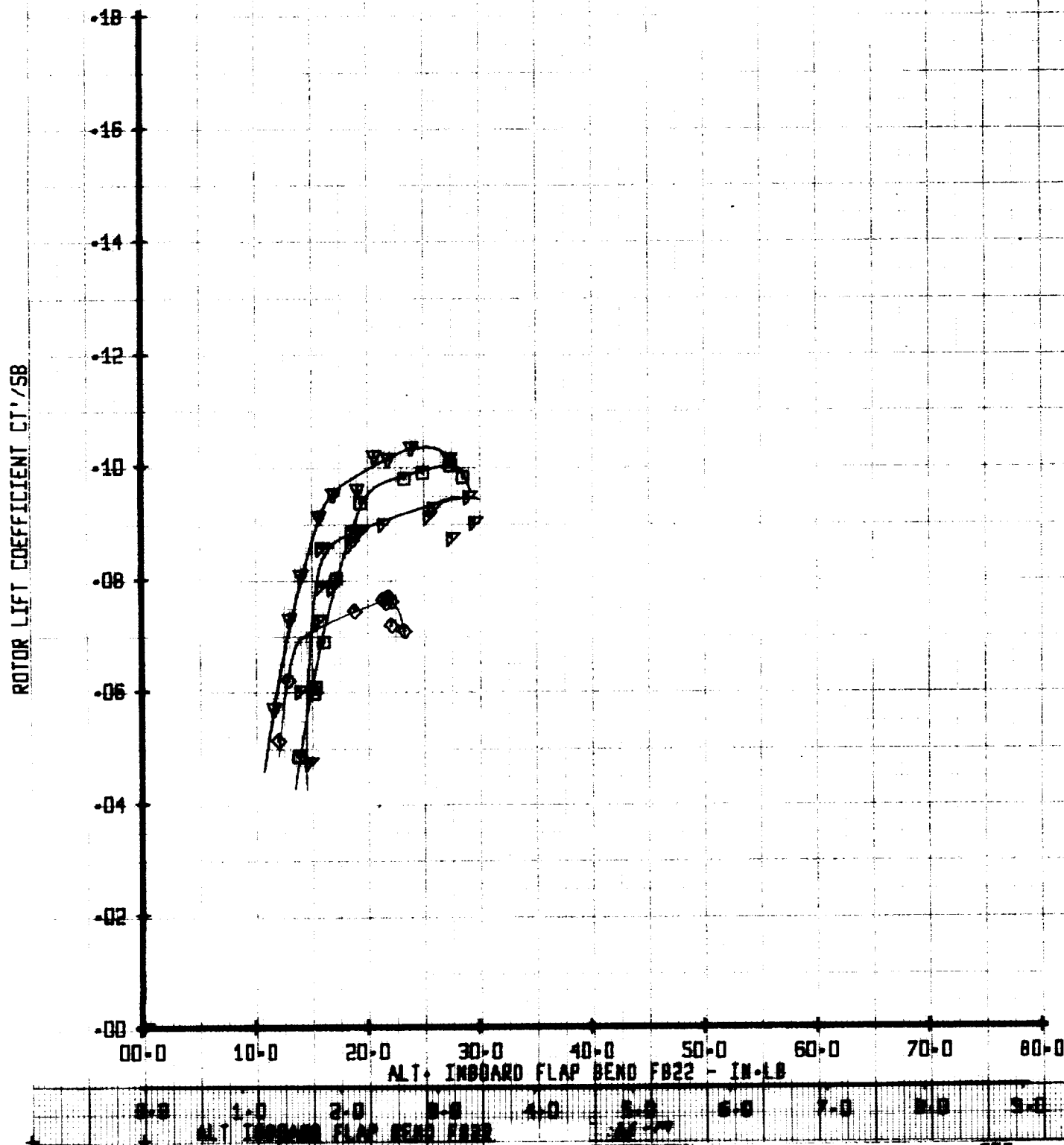


Figure A-97

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/DD258	VTUN
□	35	.45	.01	279
△	36	.45	.05	279
▽	37	.45	.10	279
▲	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN FLAP BENDING FB48

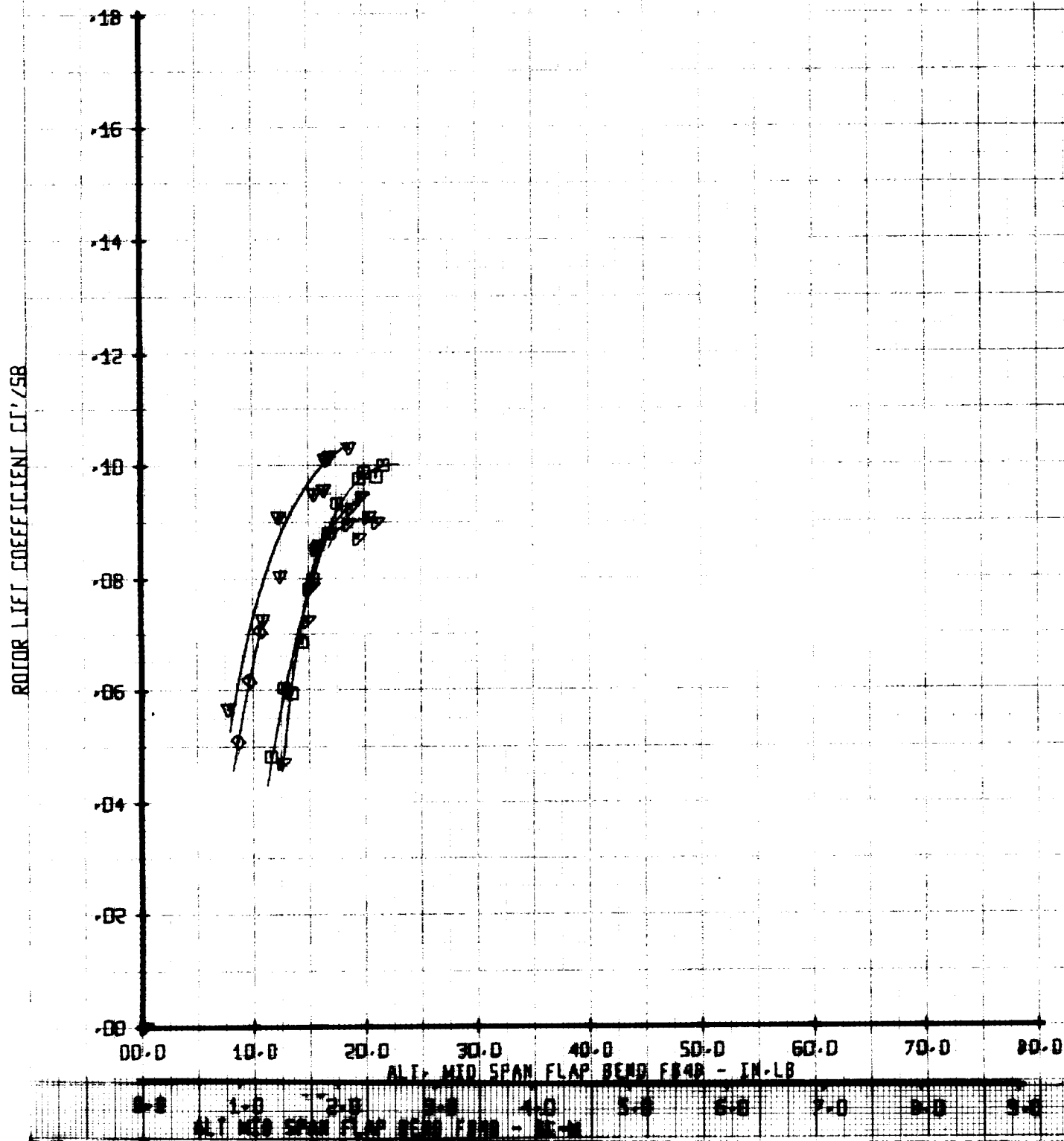


Figure A-98

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'	X/00258	VTUN
□	35	.45	.01	279
▽	36	.45	.05	279
◇	37	.45	.10	279
▼	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD FLAP BENDING FB79

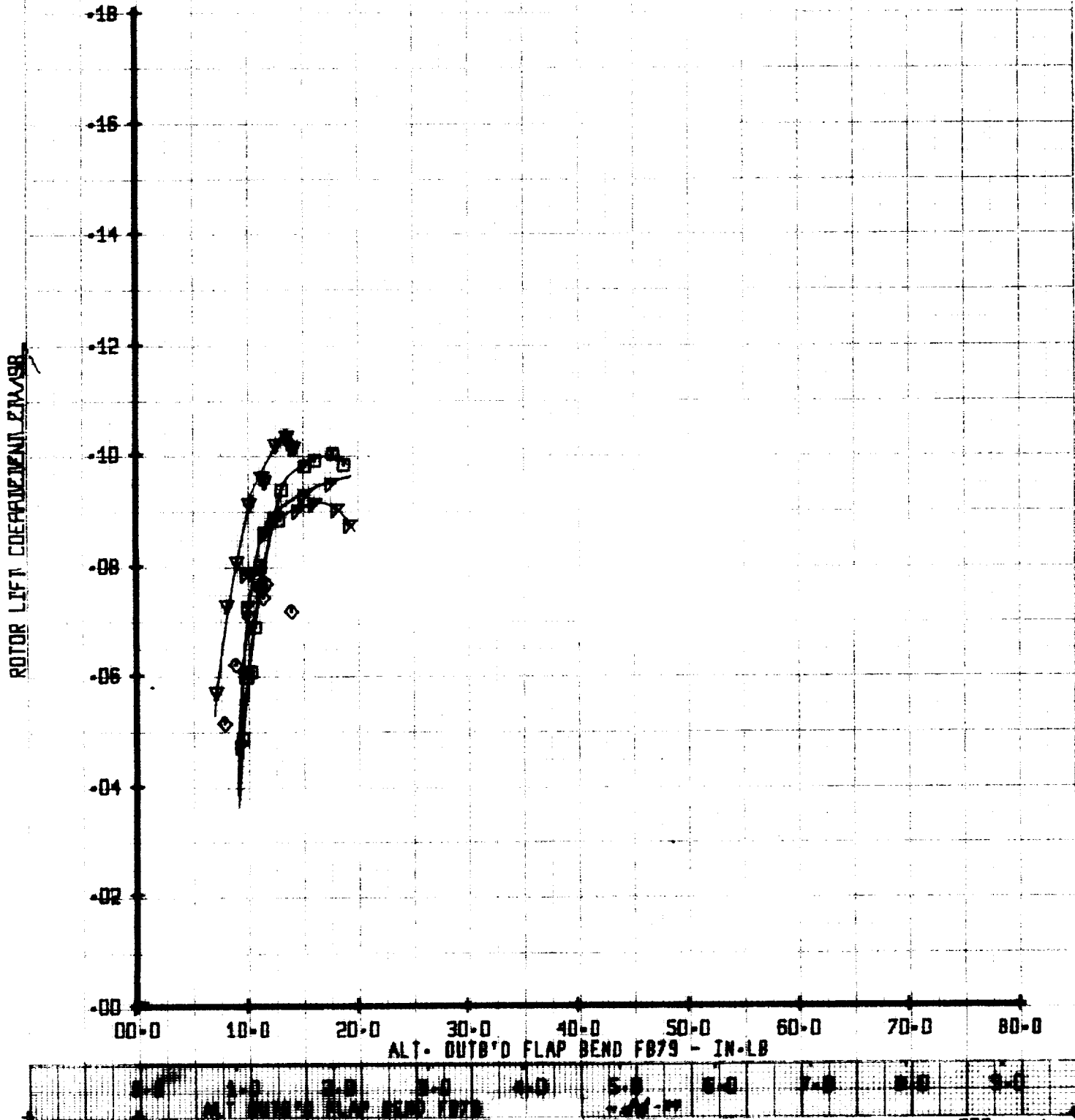
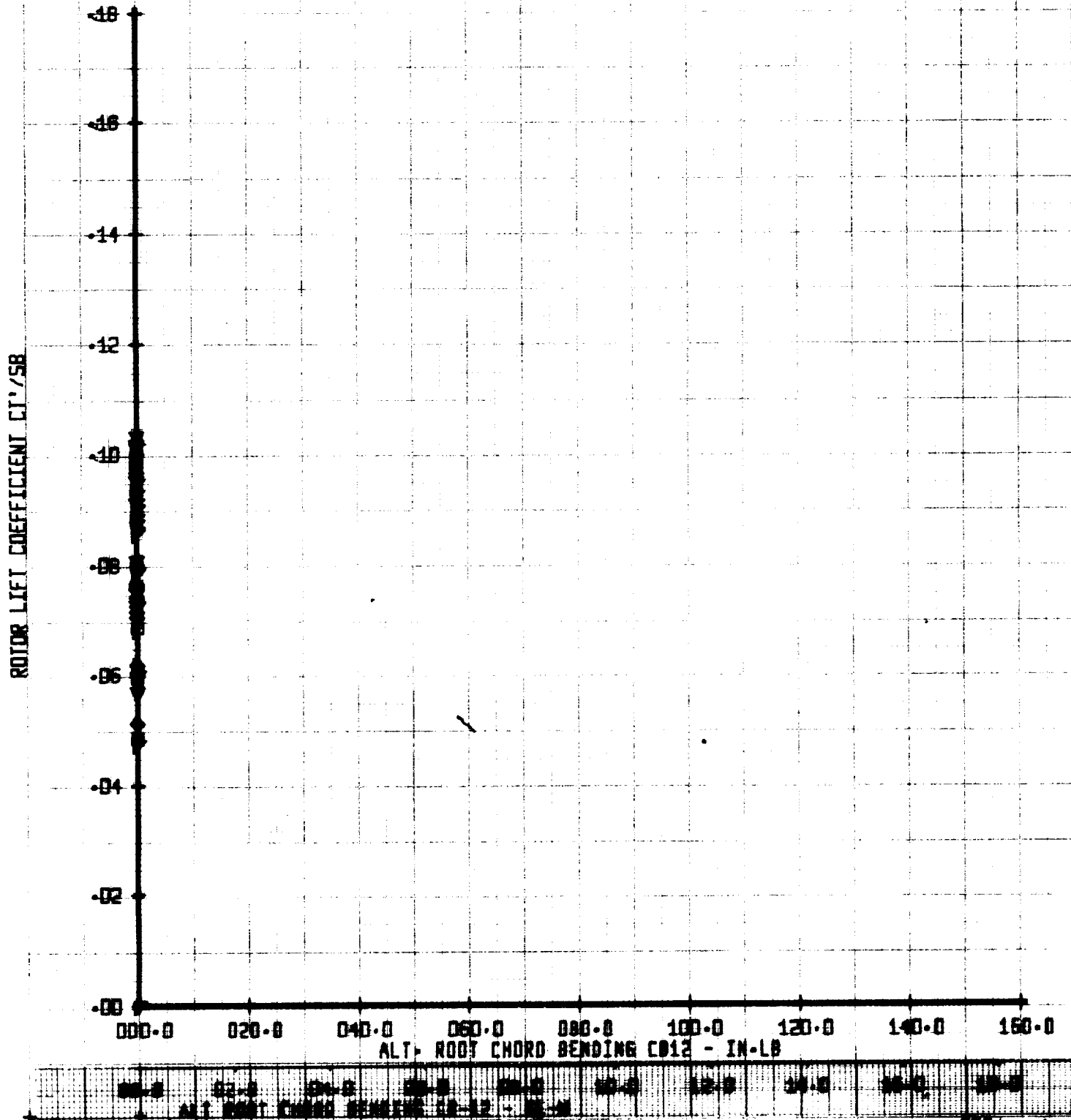


Figure A-99

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/DD2SB	VTUN
000	35	.45	.01	279
000	36	.45	.05	279
000	37	.45	.10	279
000	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

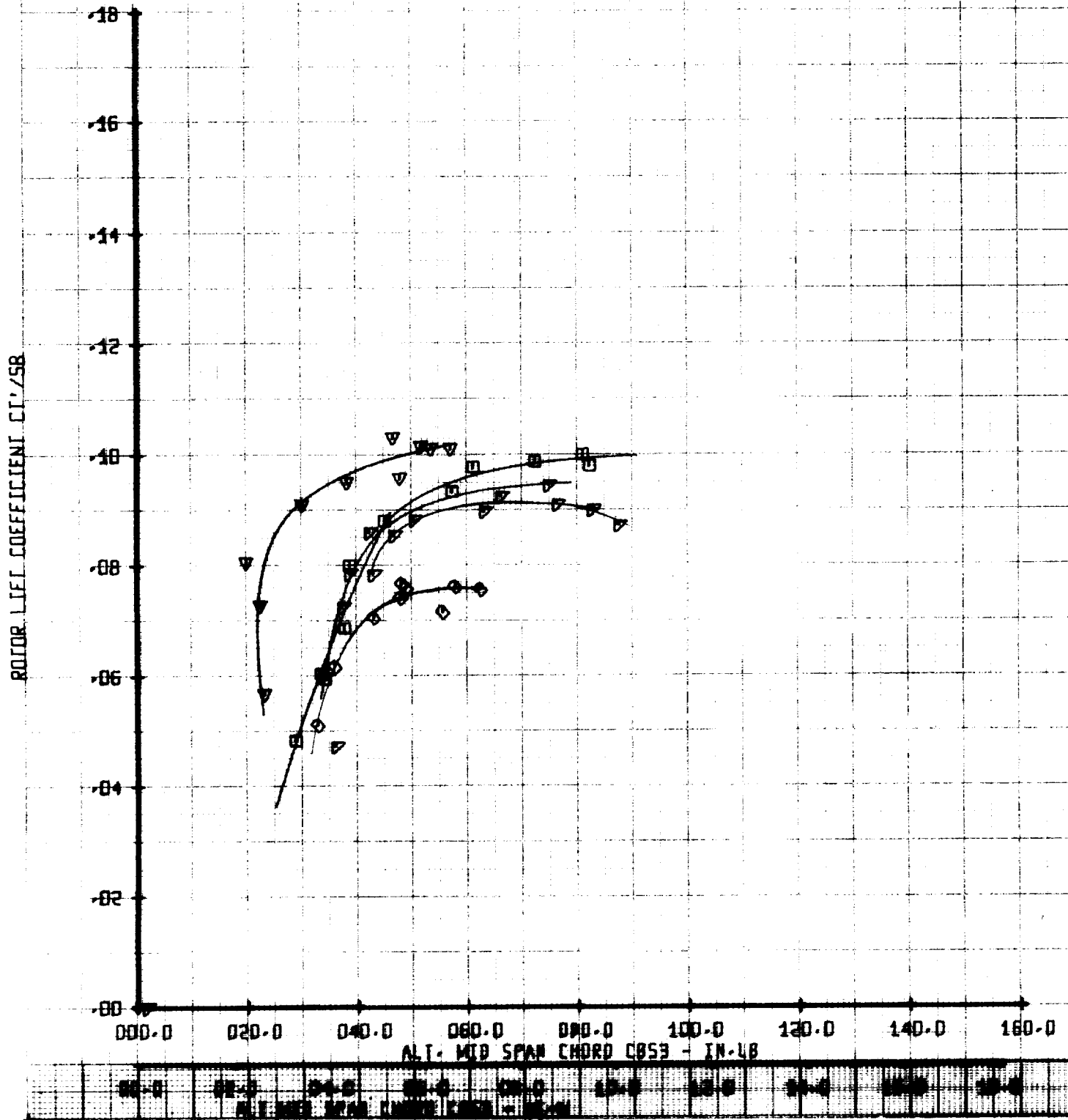


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/CD2SB	VTUN
□	35	.45	.01	279
▢	36	.45	.05	279
◇	37	.45	.18	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN CHORD CB53

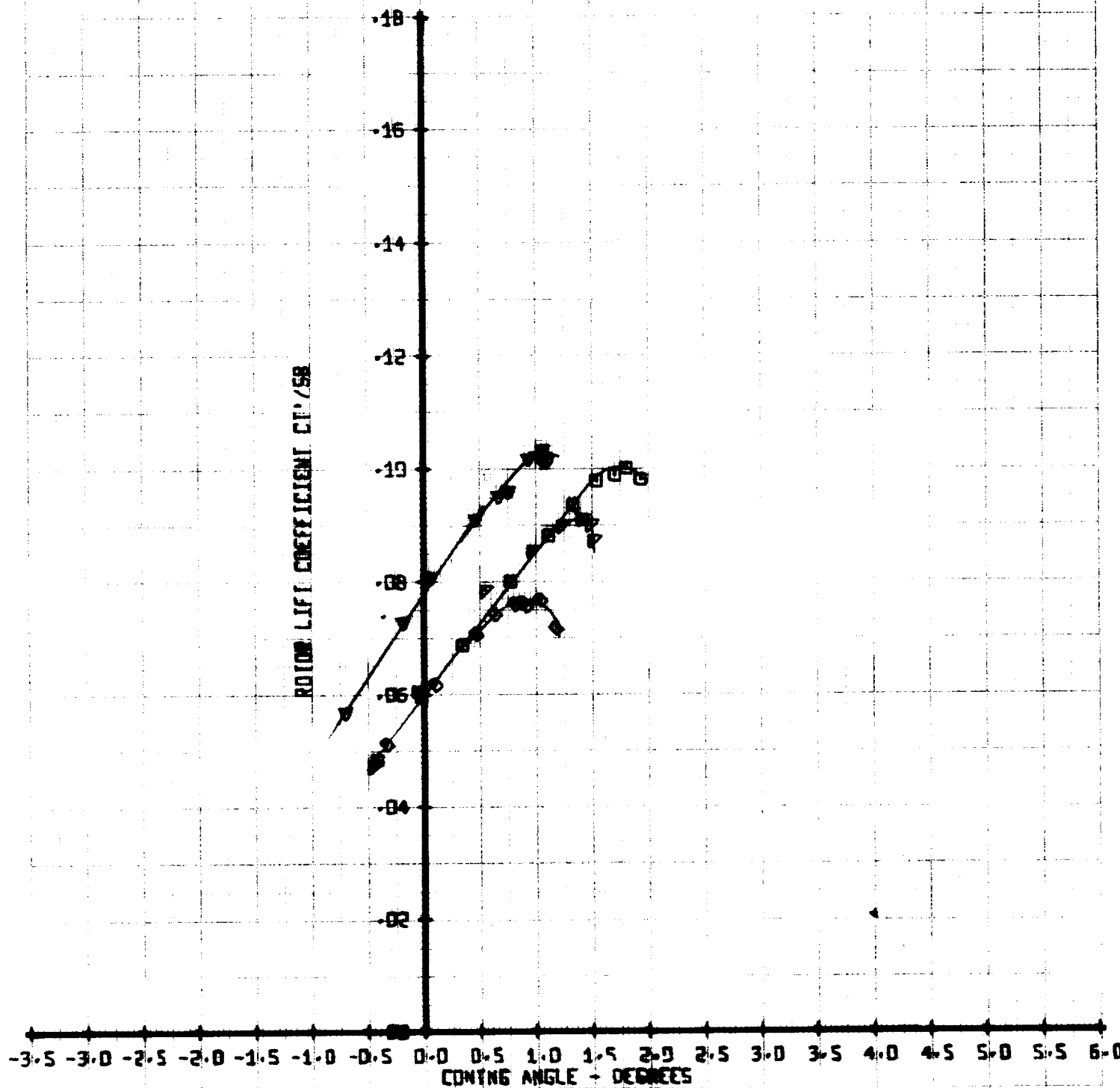


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-470 ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	1/00258	YTUM
□	35	.45	.01	279
△	36	.45	.05	279
▽	37	.45	.10	279
◇	38	.45	.20	279

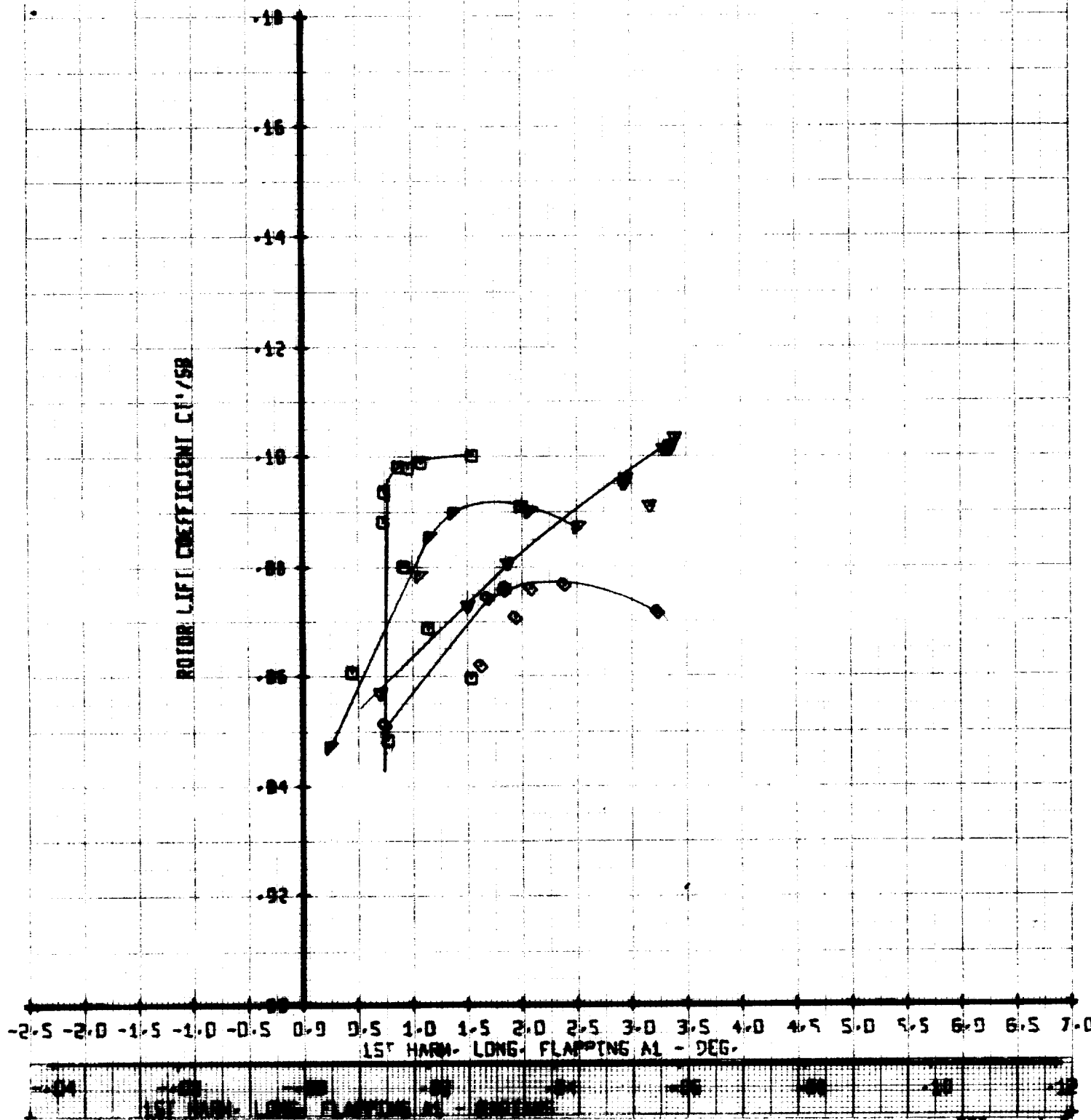
ROTOR LIFT COEFFICIENT
VERSUS
CONING ANGLE



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47A ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	YTUN
□	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1



LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/0025B	YTUN
□	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

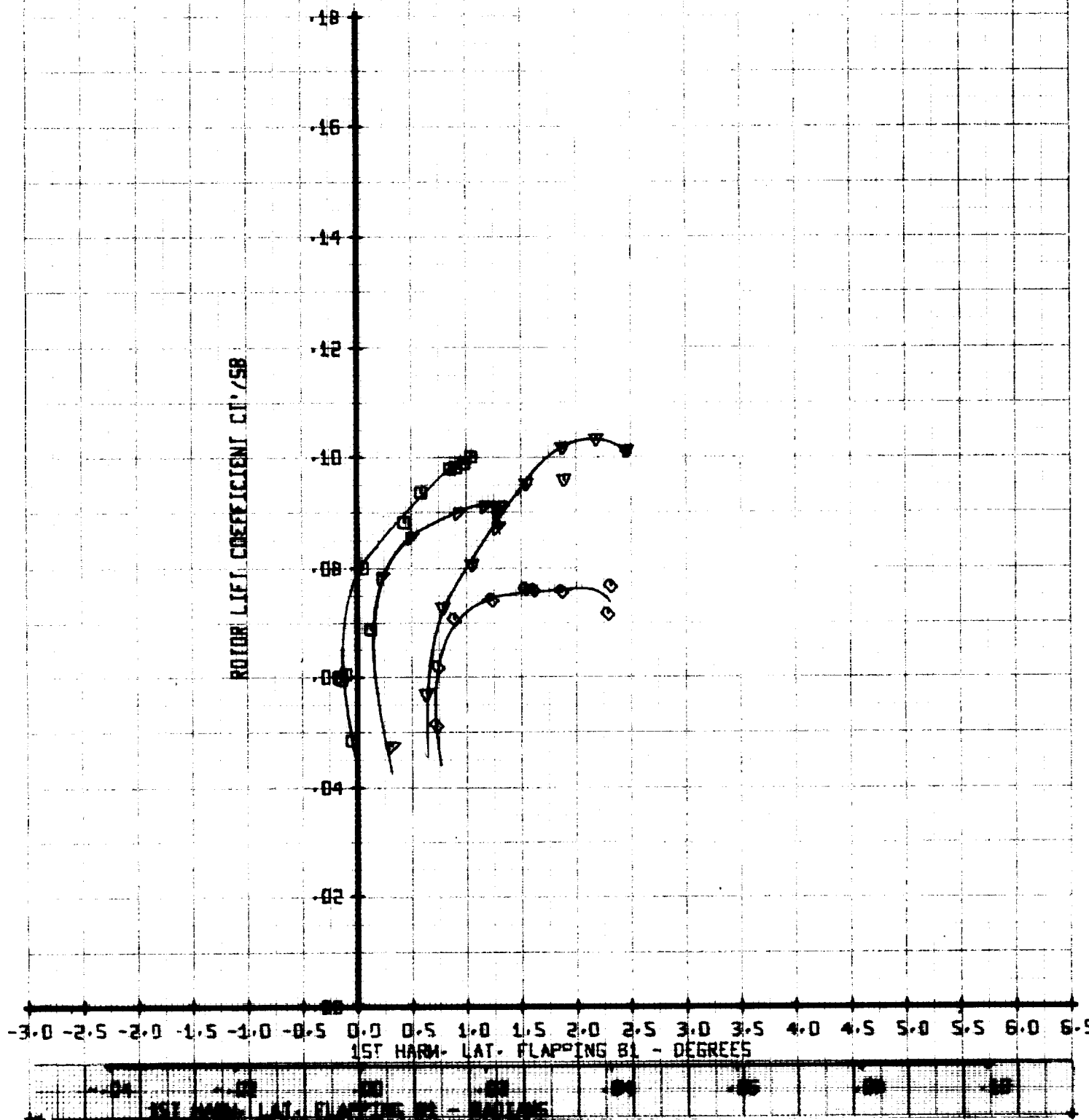


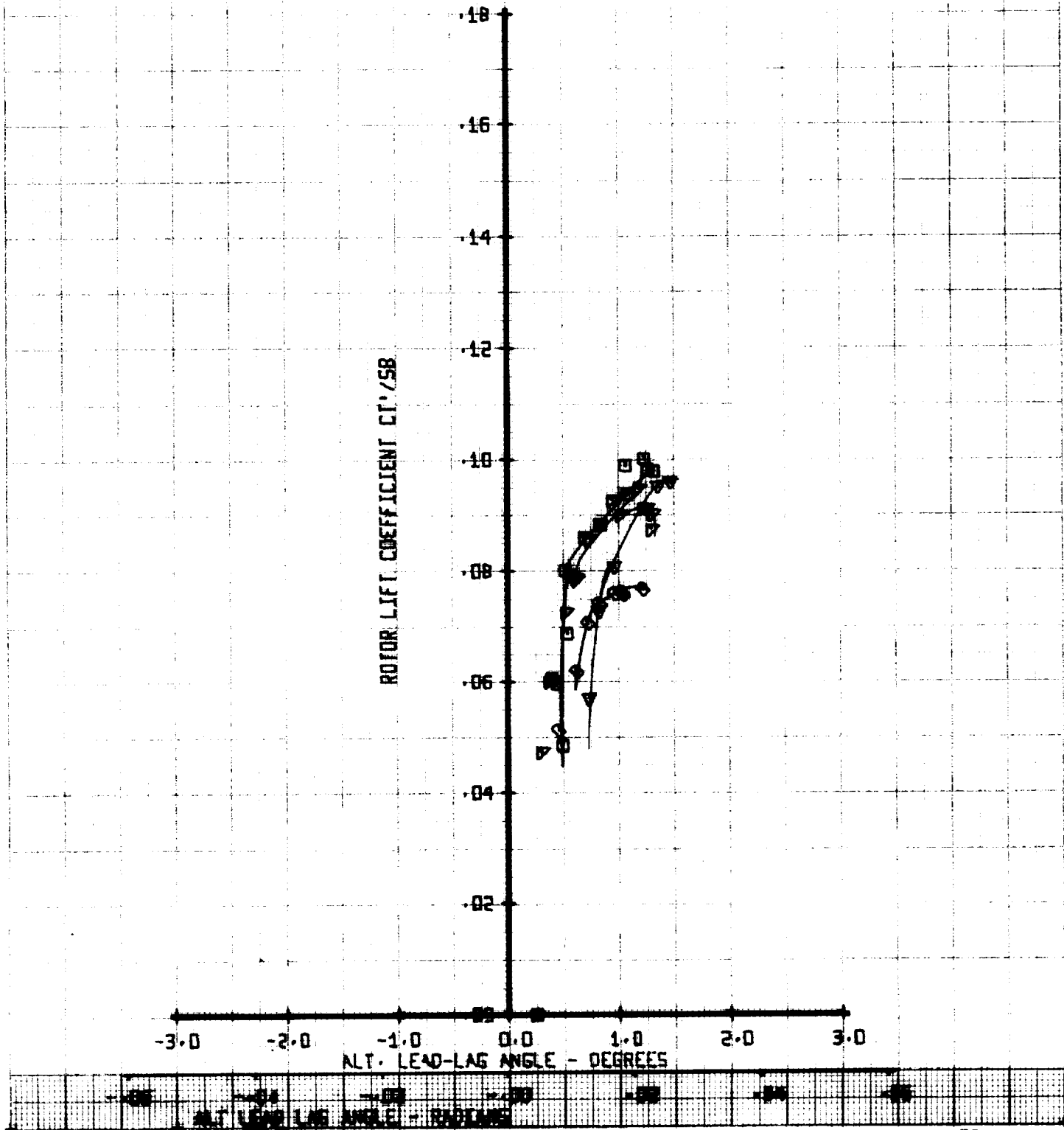
Figure A-104

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	Y/TUN
□	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE



LIFT-PROPULSIVE FORCE LIMIT TEST

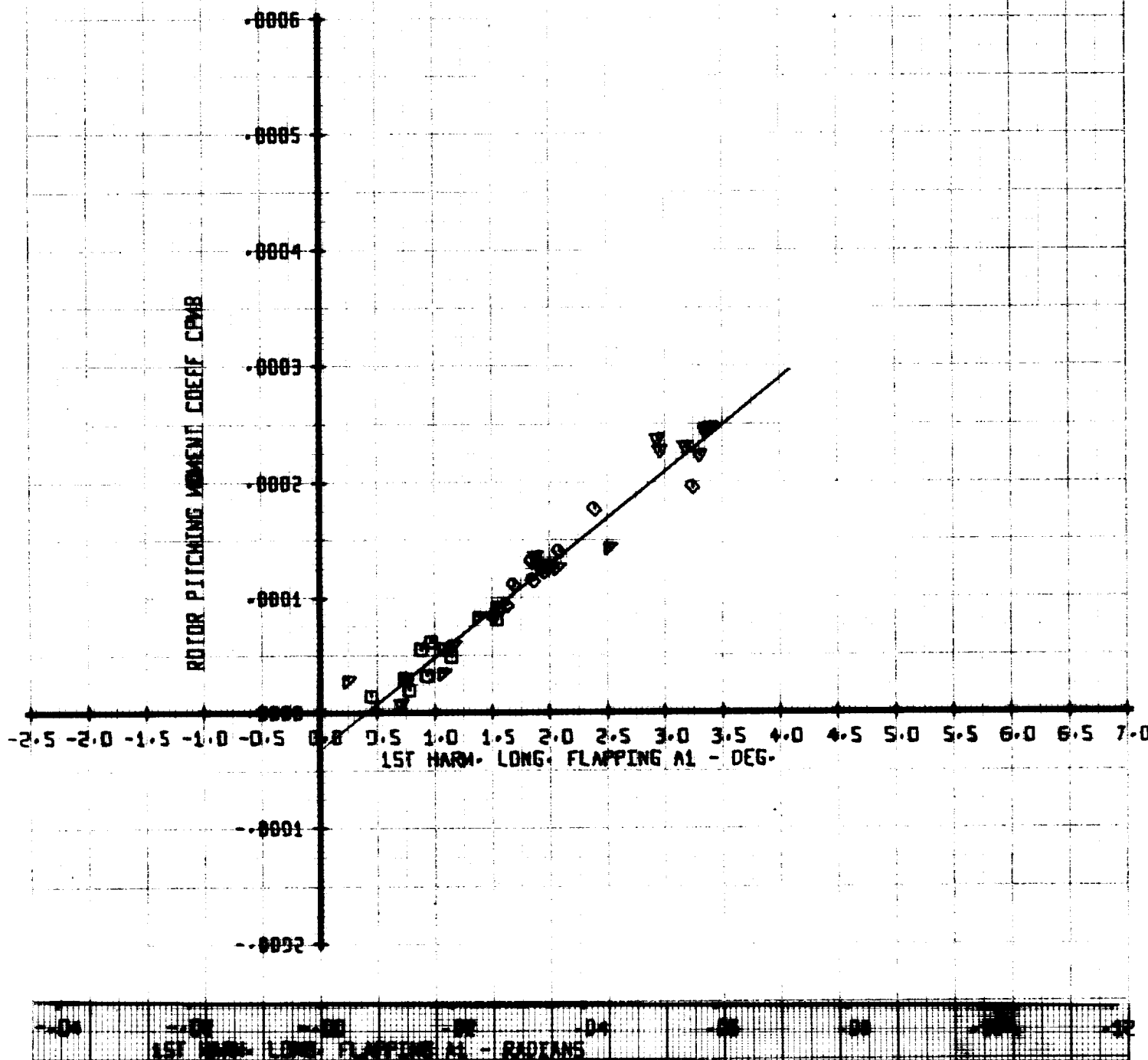
1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/BD258	YTUN
□	35	.45	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1

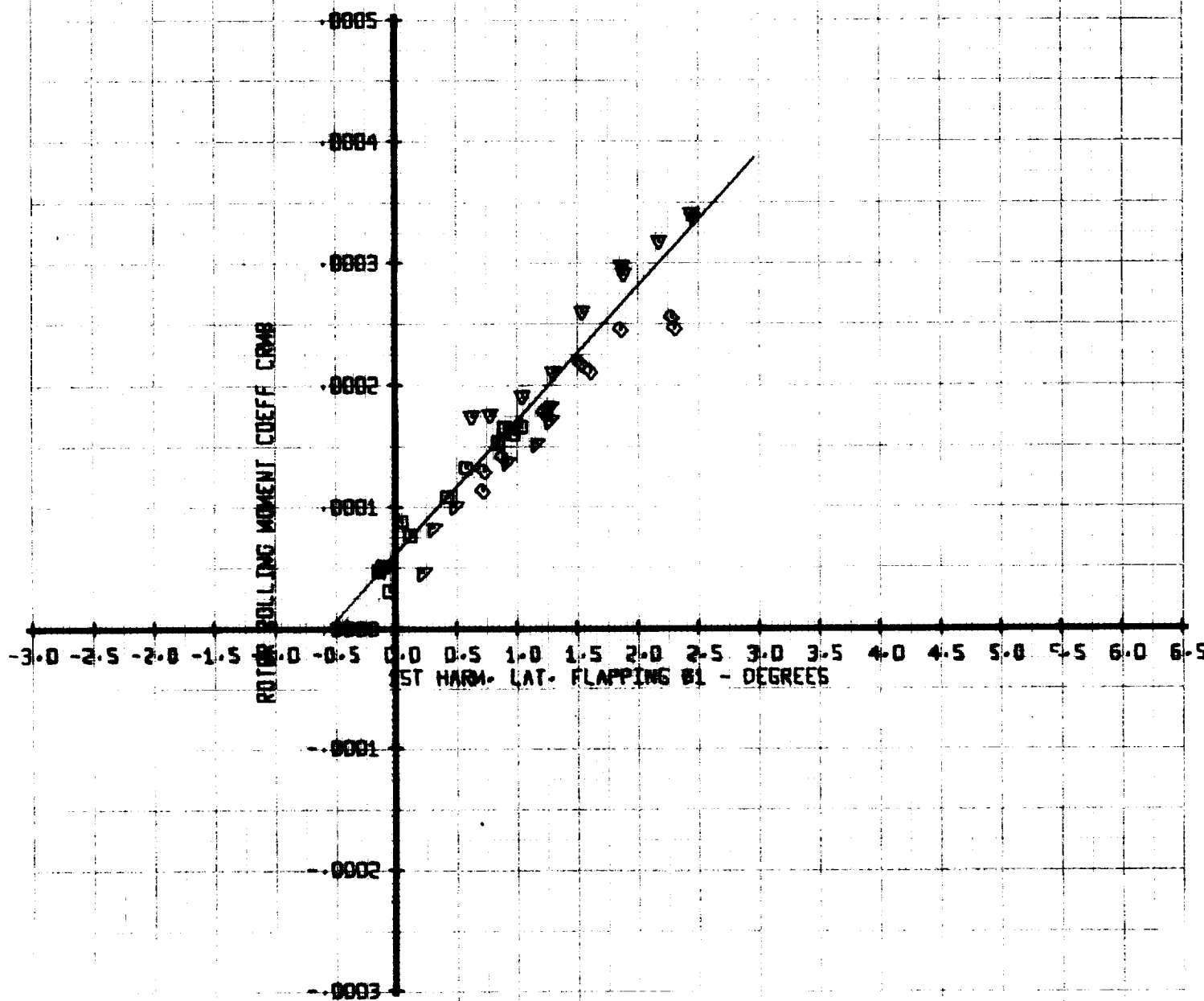


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-470 ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUM
□	35	.15	.01	279
△	36	.45	.05	279
◇	37	.45	.10	279
▽	38	.45	.20	279

ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1



1ST HARM. LAT. FLAPPING B1 - DEGREES

Figure A-107.

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML	X/00258	VTUN
0	40	.50	.025	310
7	39	.50	.05	310
4	41	.50	.10	310
4	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PROPULSIVE FORCE COEFFICIENT

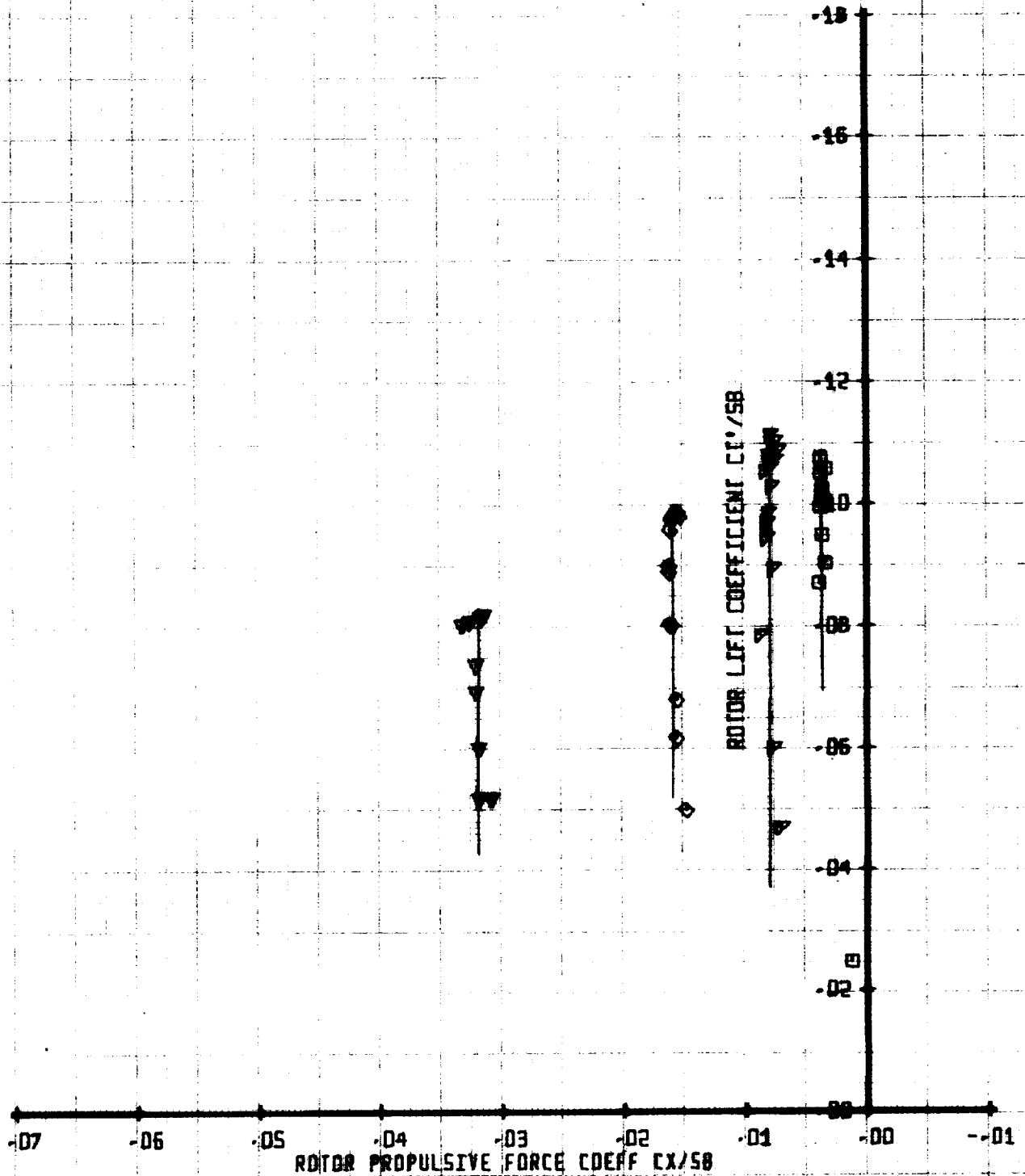


Figure A-108

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/DD258	VTUN
○	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK

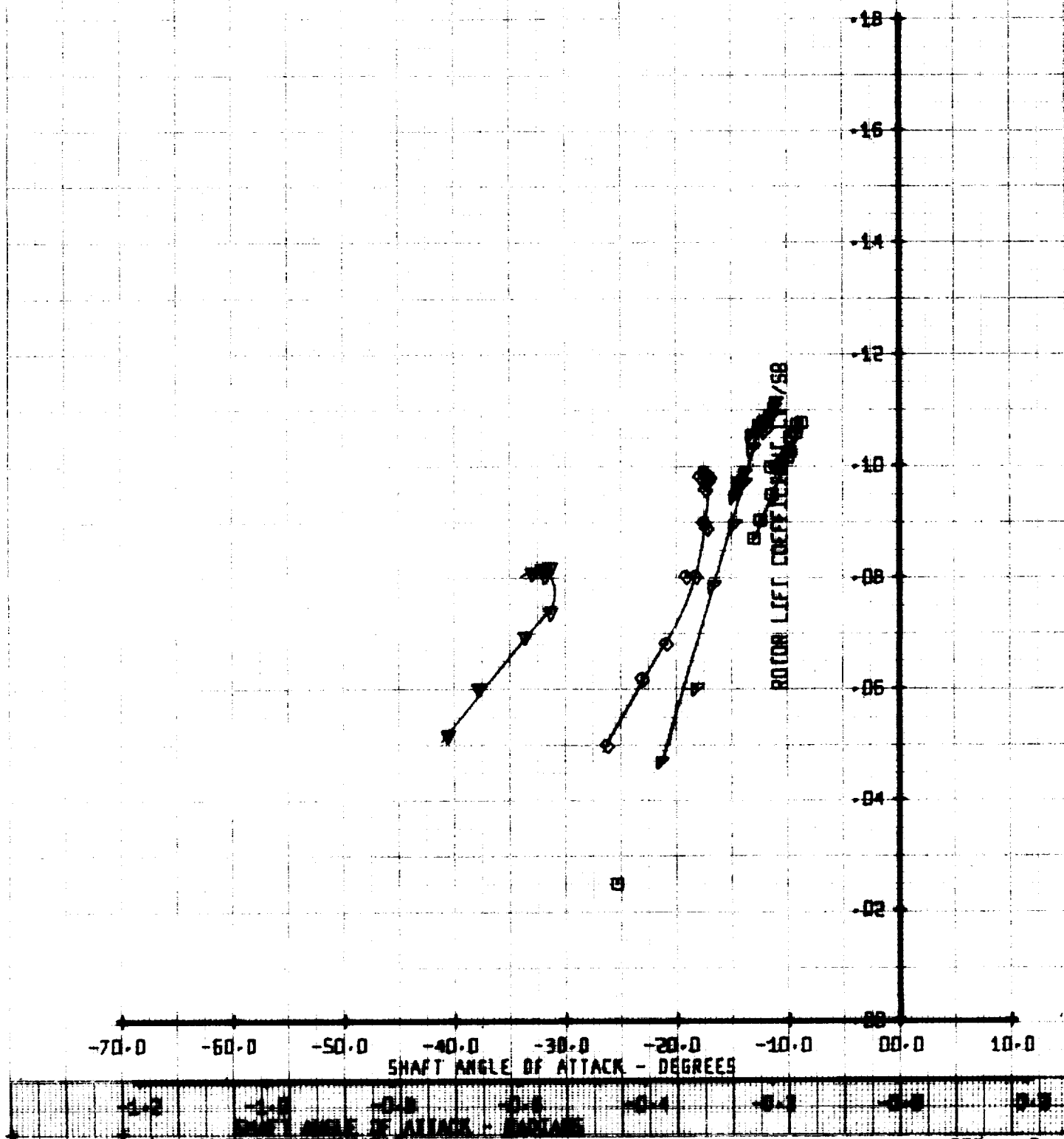


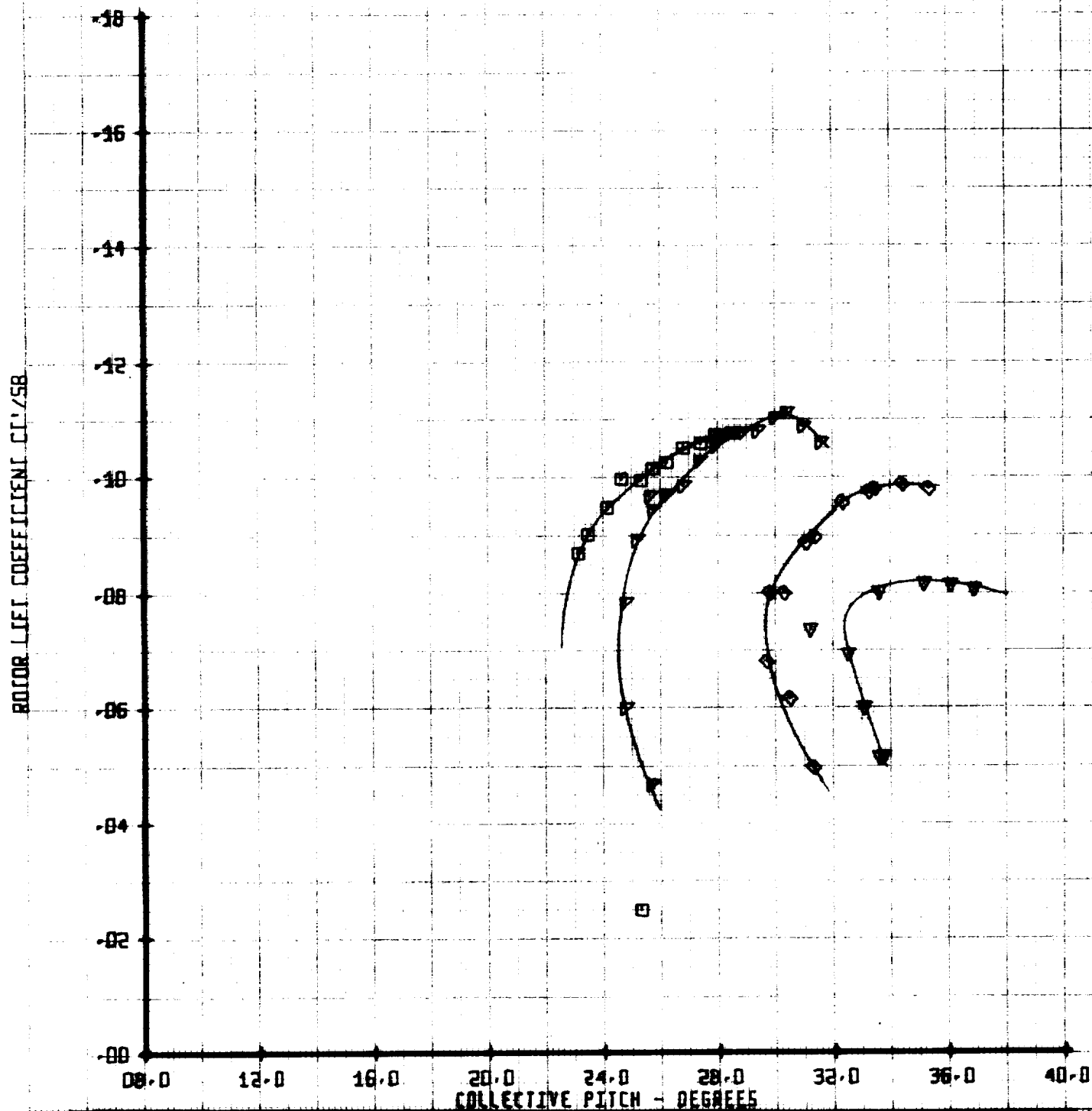
Figure A-109

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SAM	RUN	MU'	X/00258	VTUN
40	40	.50	.025	310
39	39	.50	.05	310
41	41	.50	.10	310
42	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH



COLLECTIVE PITCH - DEGREES

SET 5
BWT 187

Figure A-110

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE OH-470 ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
○	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
LONGITUDINAL CYCLIC

ROTOR LIFT COEFFICIENT $CI' / 258$

0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00

-08.0 -04.0 00.0 04.0 08.0 12.0 16.0 20.0 24.0

LONGITUDINAL CYCLIC - DEGREES

LONGITUDINAL CYCLIC - RADIANS

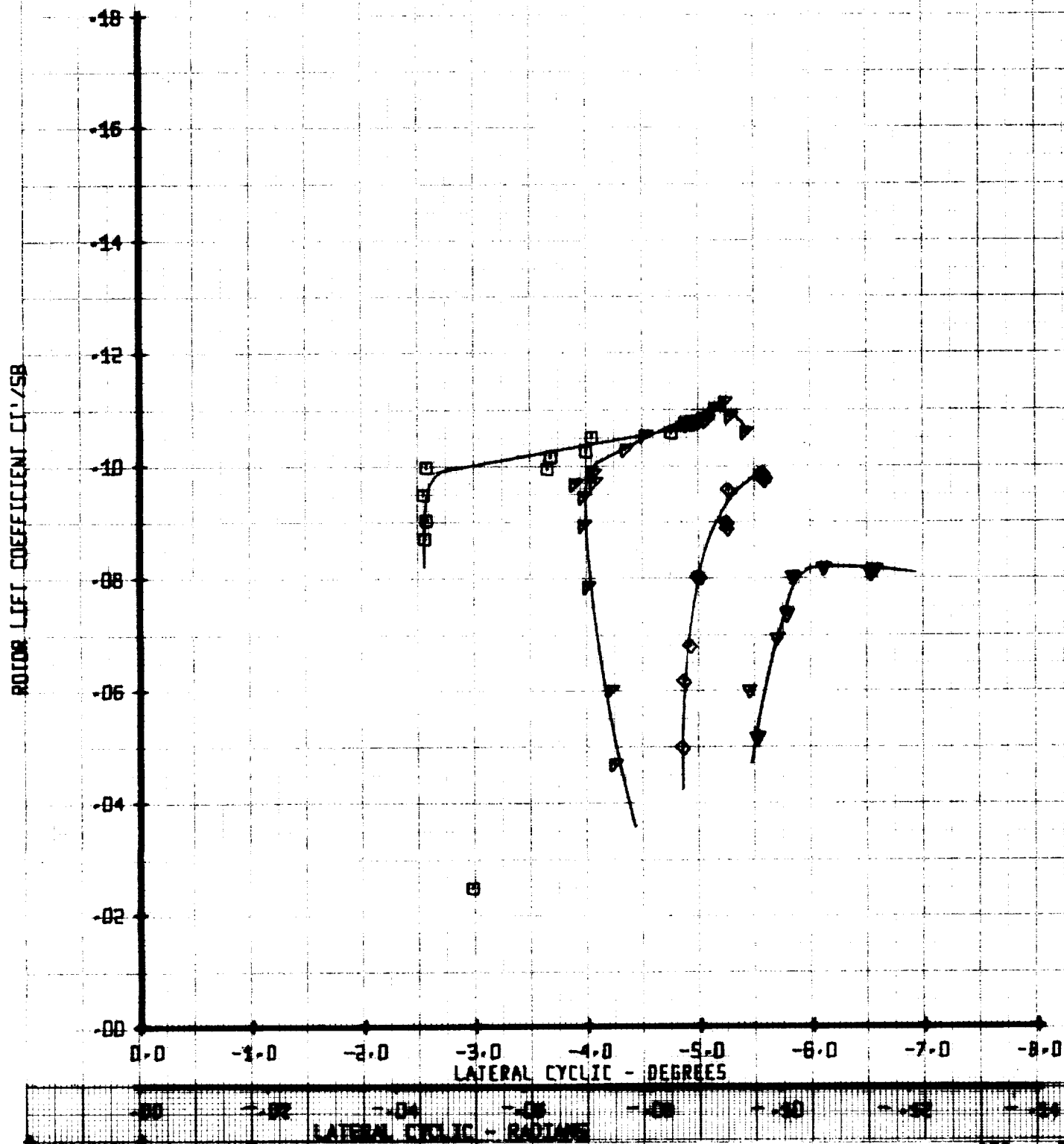
SET 5
BVWT 187

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
40	40	.50	.025	310
41	39	.50	.05	310
42	41	.50	.10	310
43	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
LATERAL CYCLIC



LIFT-PROPULSIVE FORCE LIMIT TEST

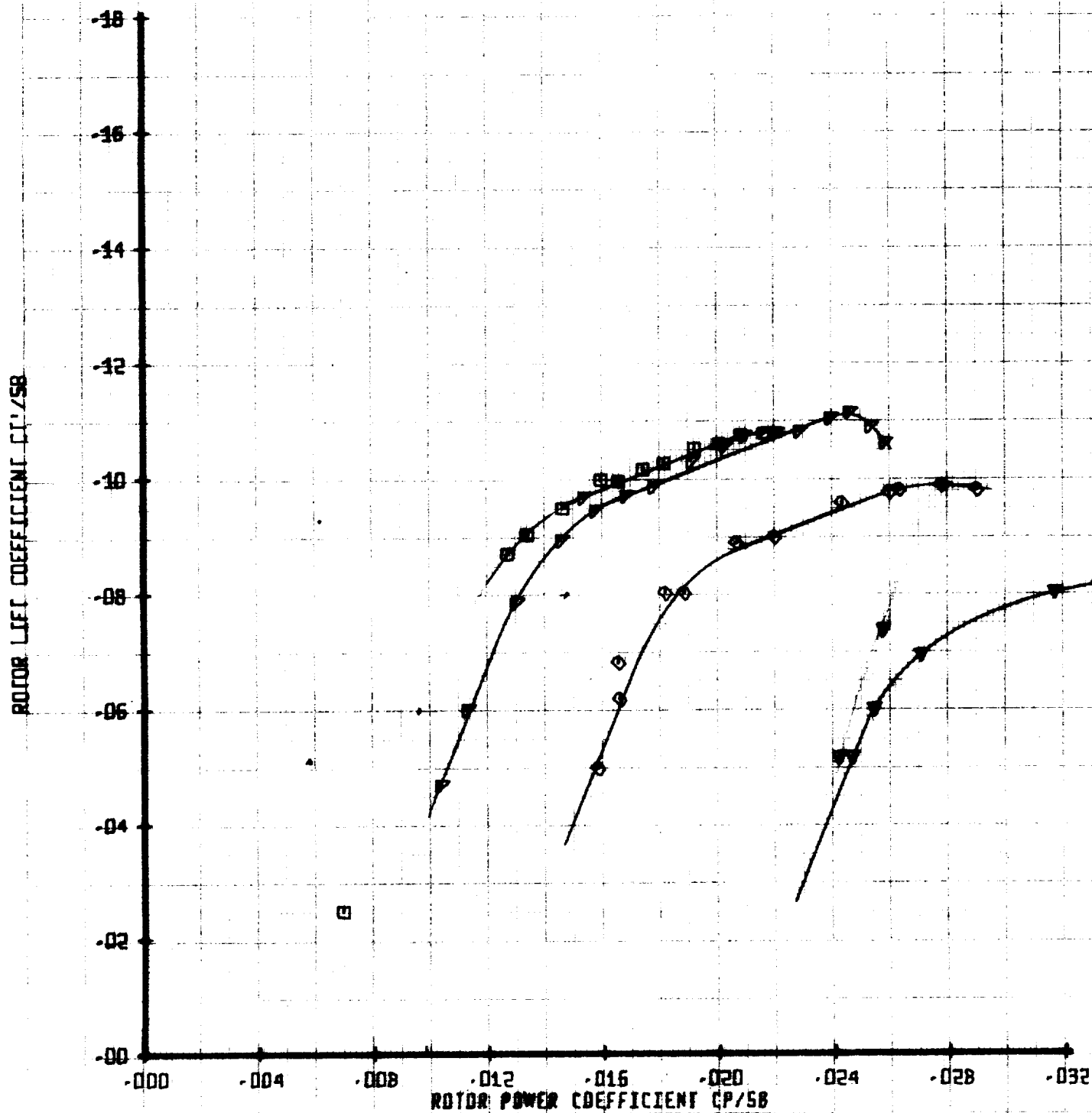
1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTUN
◇	40	.50	.025	310
◇	39	.50	.05	310
◇	41	.50	.10	310
◇	42	.50	.20	310

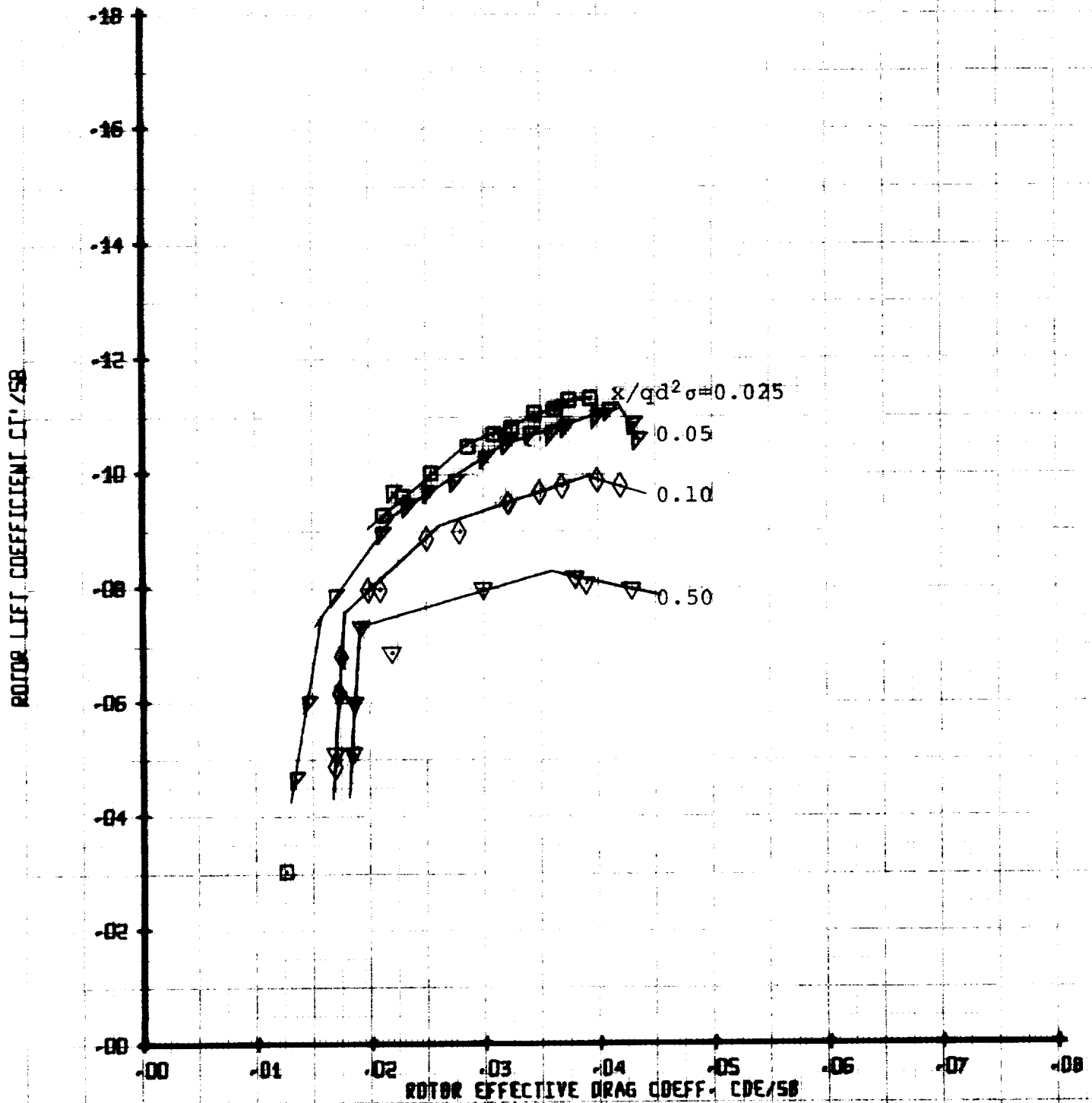
ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU'	X/QR298	VTUN
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT

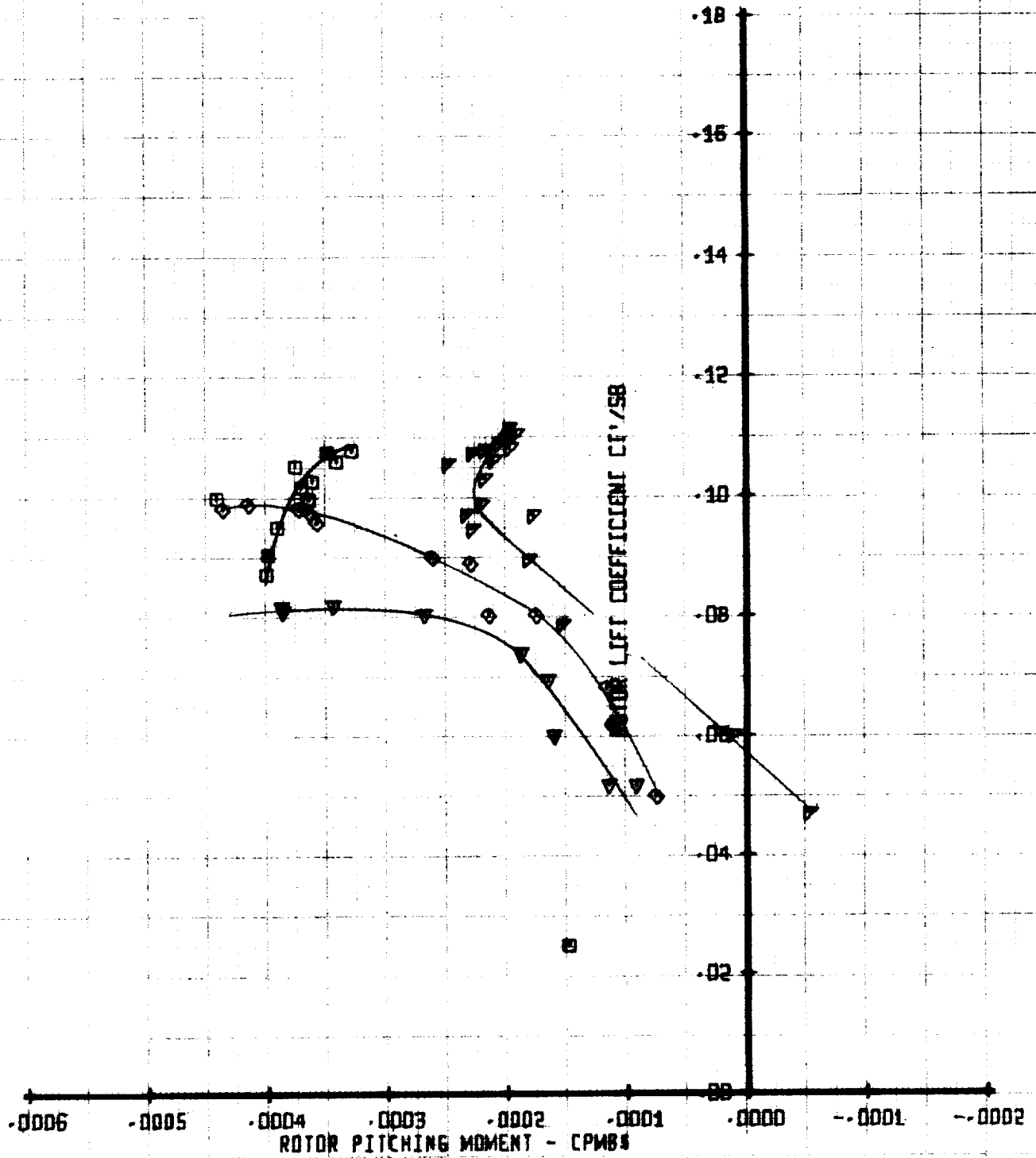


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT



LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MUP	X/DD25B	VTUN
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT

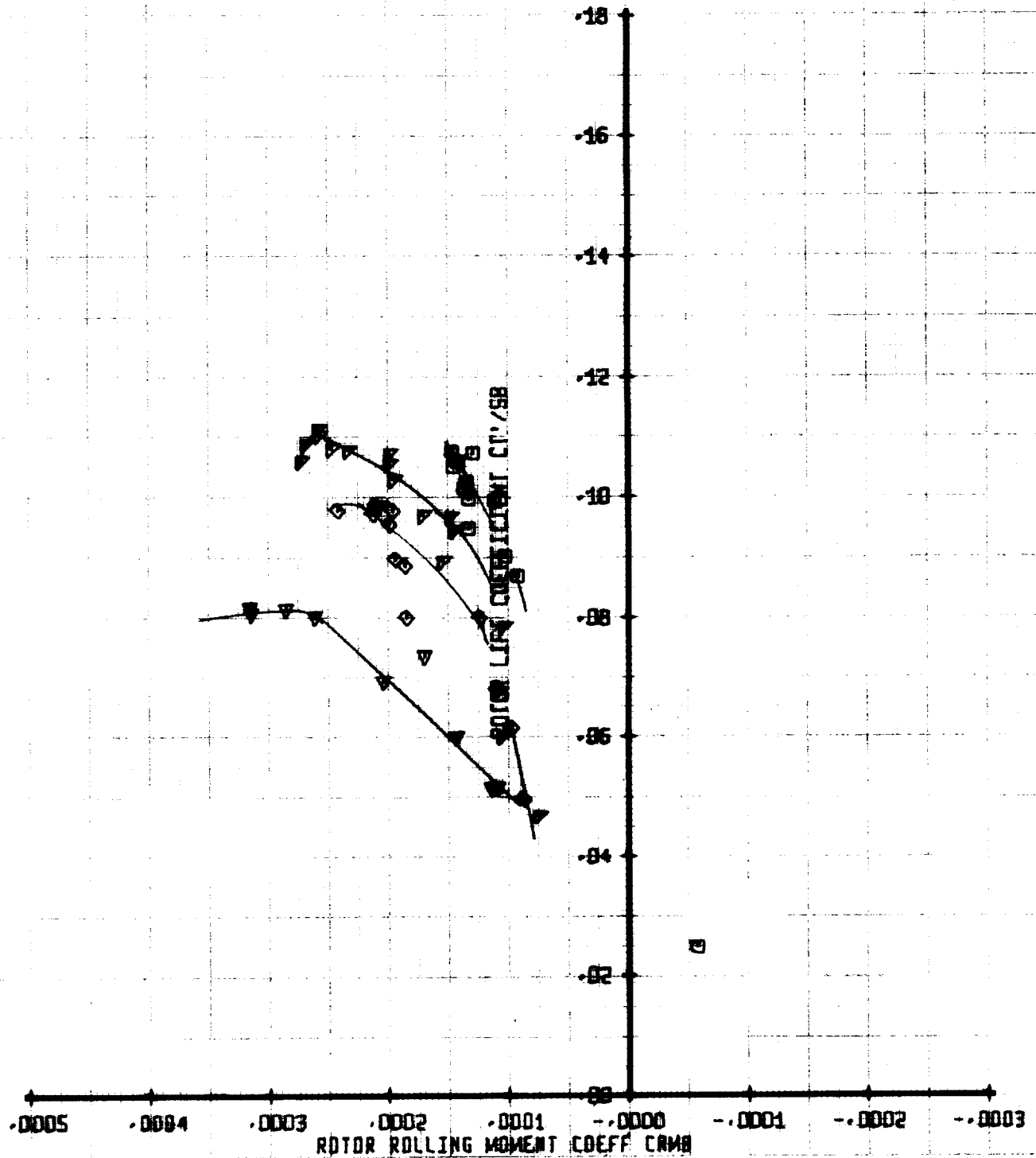


Figure A-116

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'	X/00258	VTUN
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT

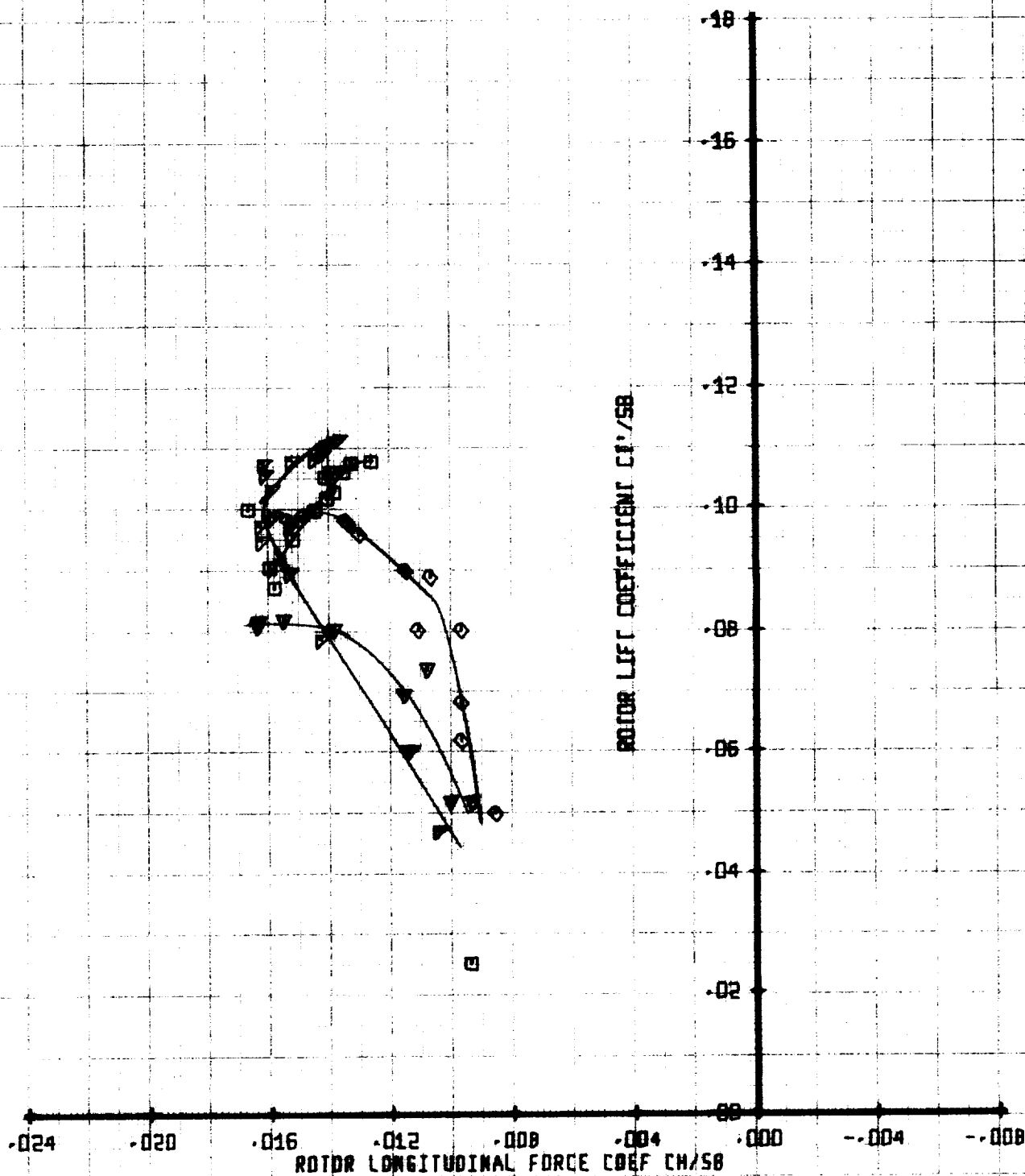


Figure A-117

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	MIN	ML'	X/00258	VTUN
◇	40	.50	.025	310
◇	39	.50	.05	310
◇	41	.50	.10	310
◇	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT

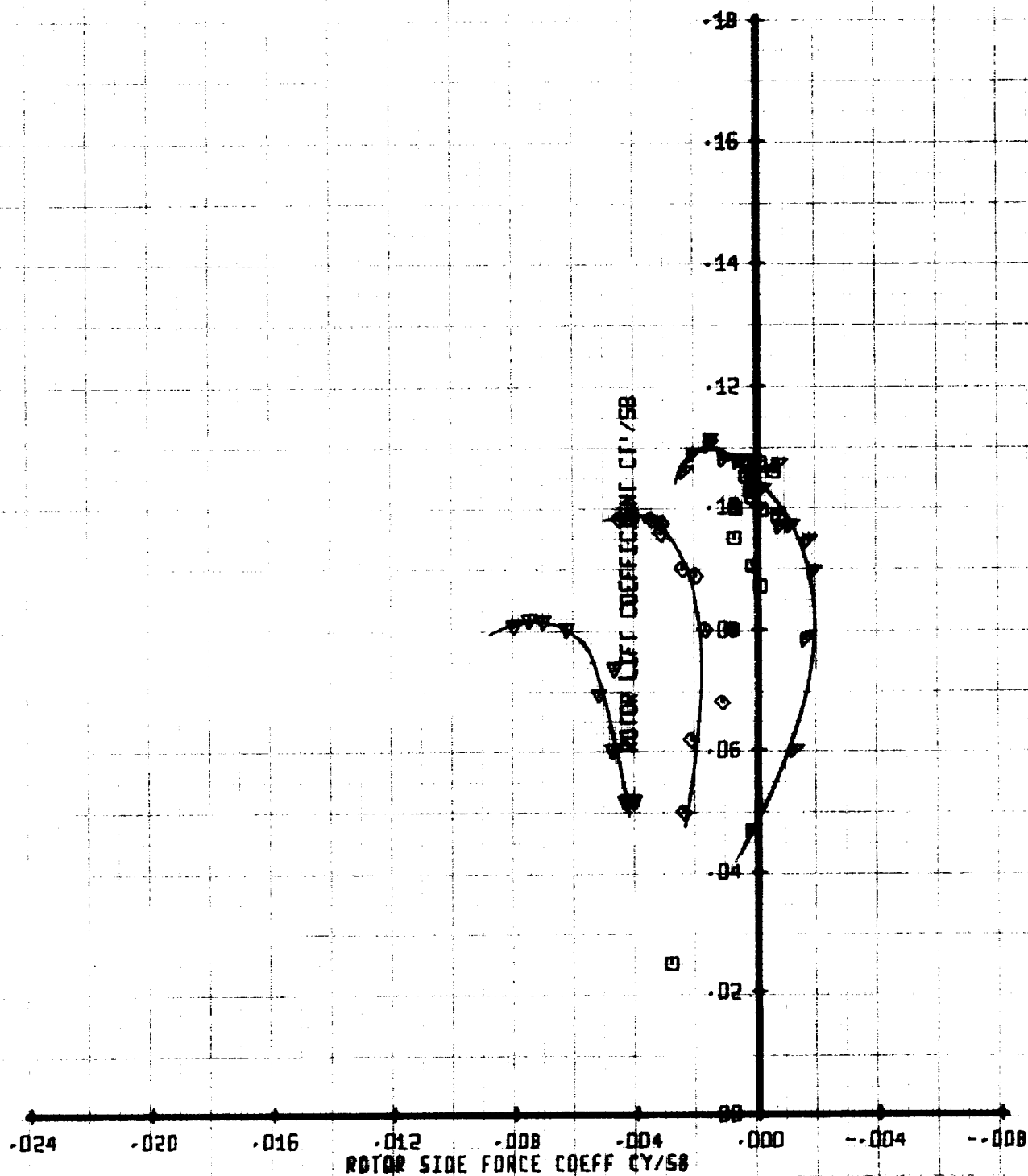


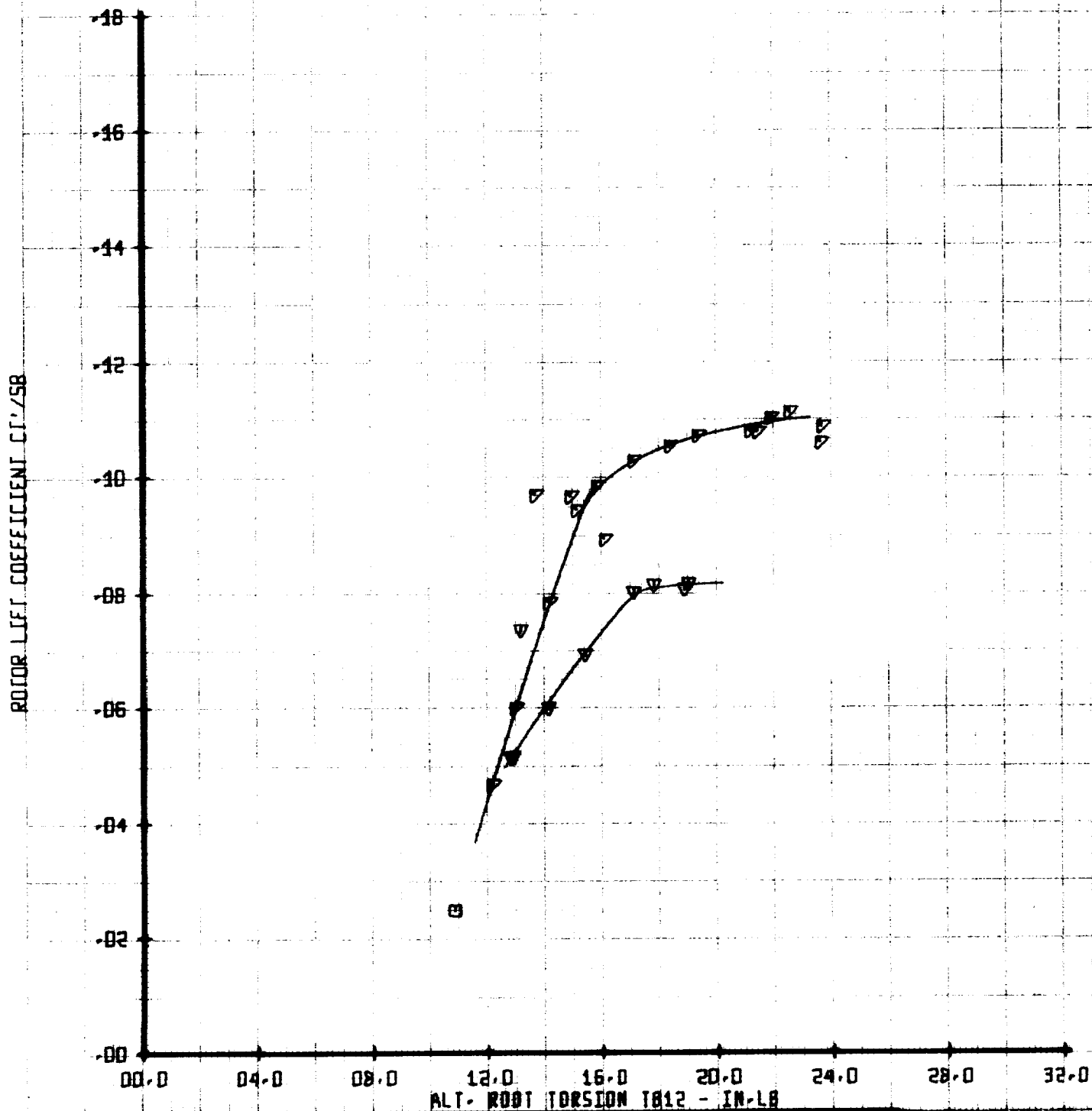
Figure A-118

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-42B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
○	40	.50	.025	310
△	39	.50	.05	310
▽	41	.50	.10	310
▲	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	YTUN
□	40	.50	.025	310
▽	39	.50	.05	310
◇	41	.50	.10	310
▼	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING INBOARD TORSION TB20

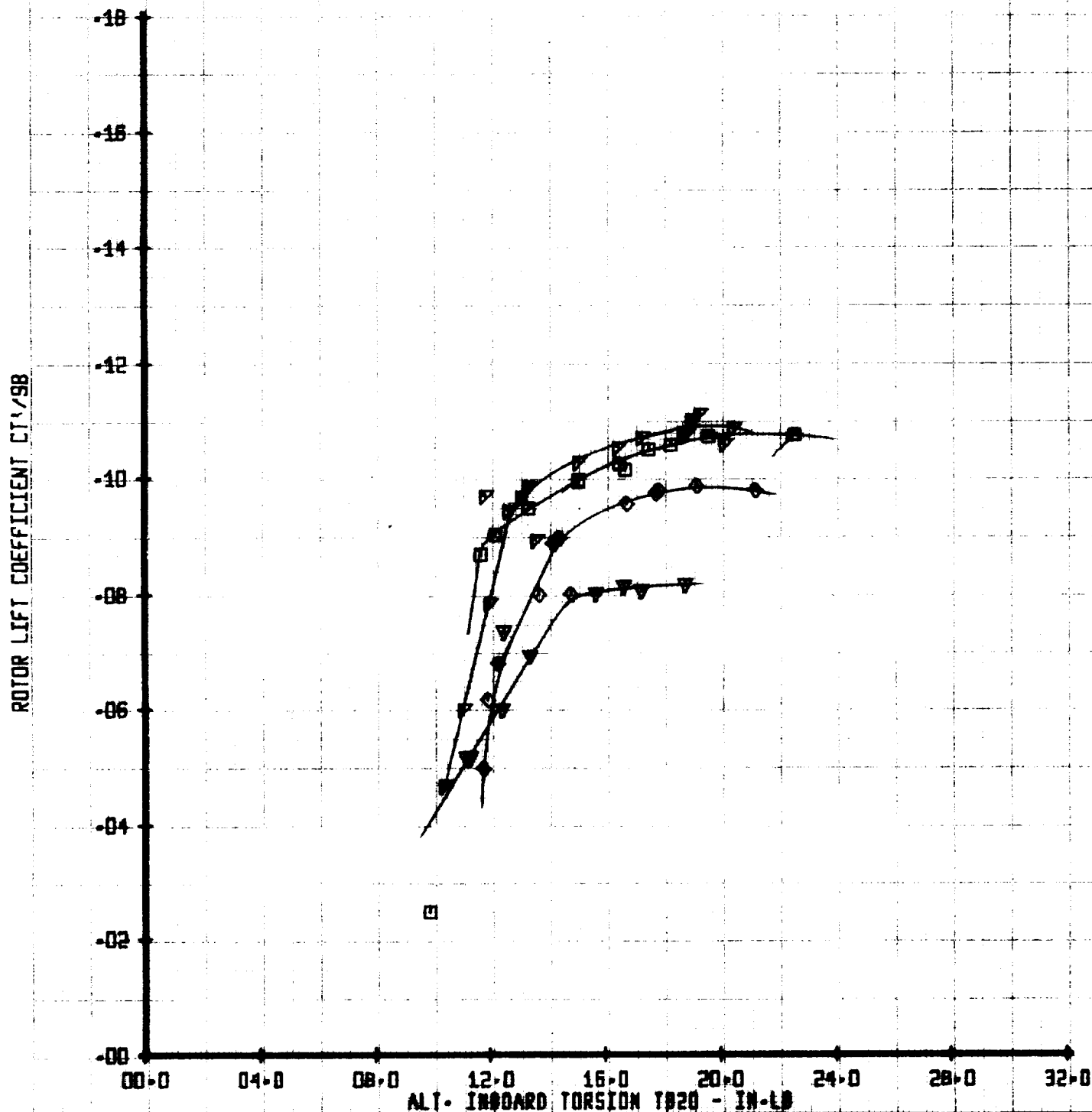


Figure A-120

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML	X/00258	VIUN
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB51

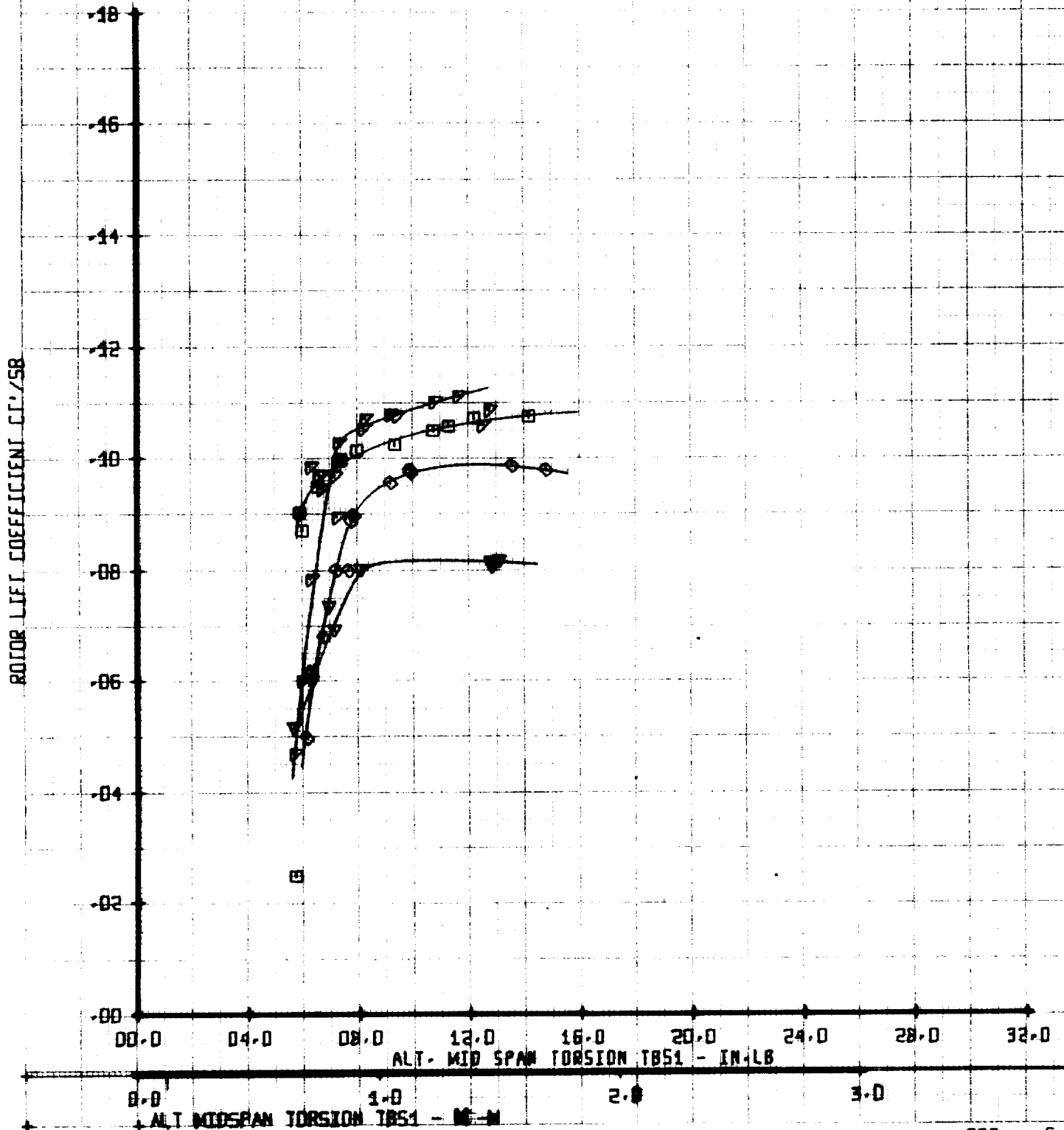


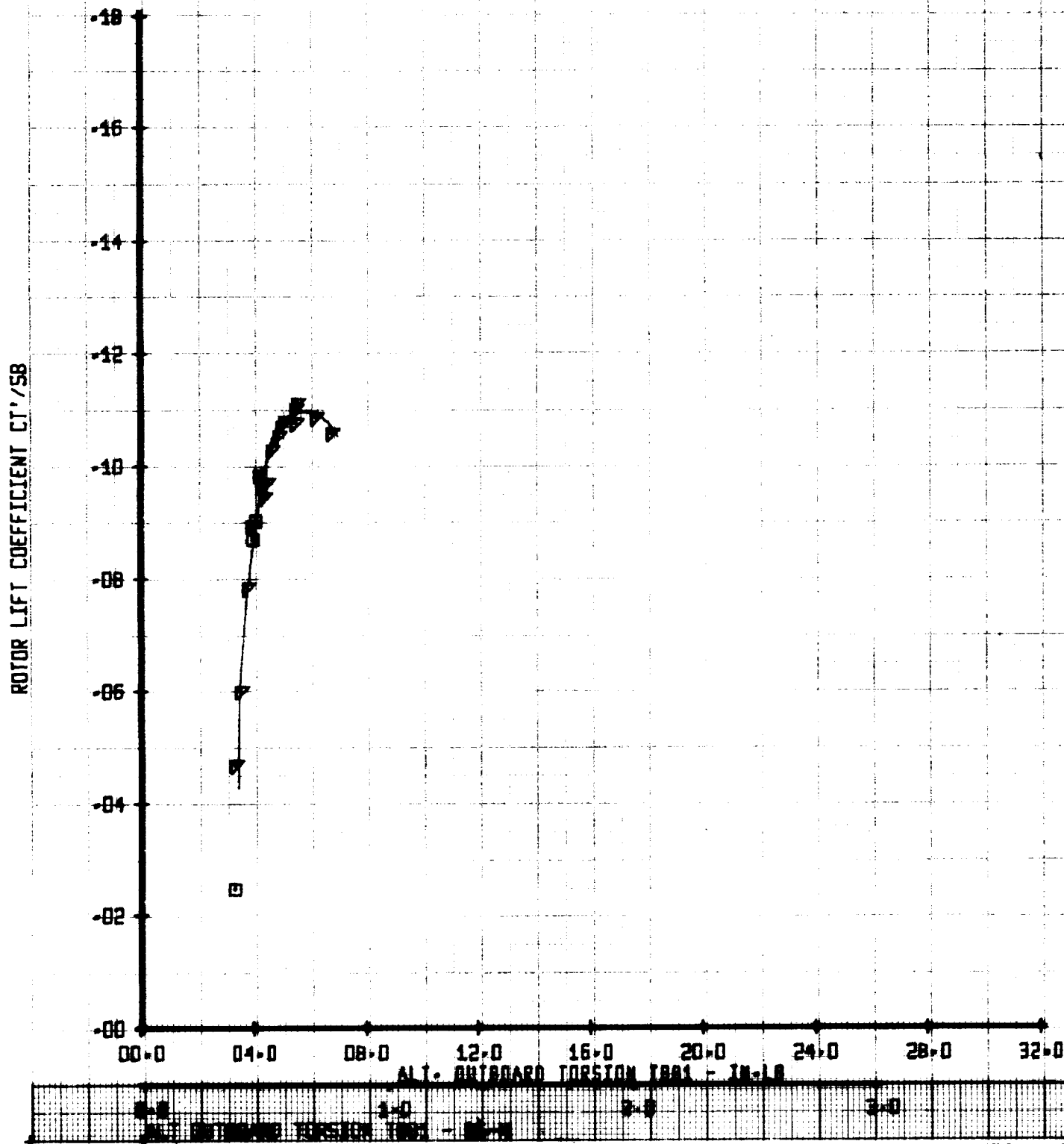
Figure A-121

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/002SB	VTUN
○	40	.50	.025	310
▽	39	.50	.05	310
◇	41	.50	.10	310
▼	42	.50	.20	310

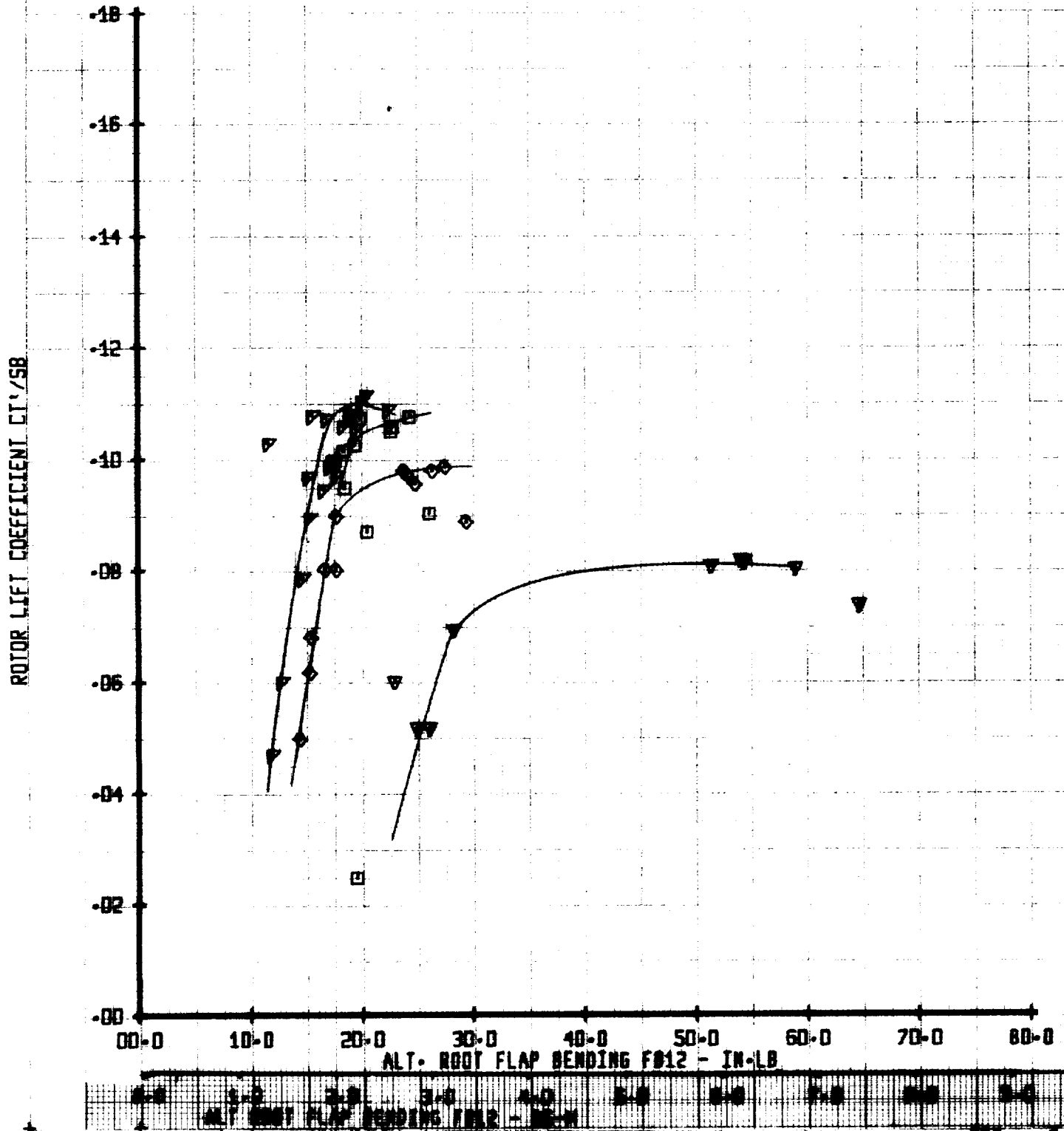
ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB81



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/DO258	VTUN
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

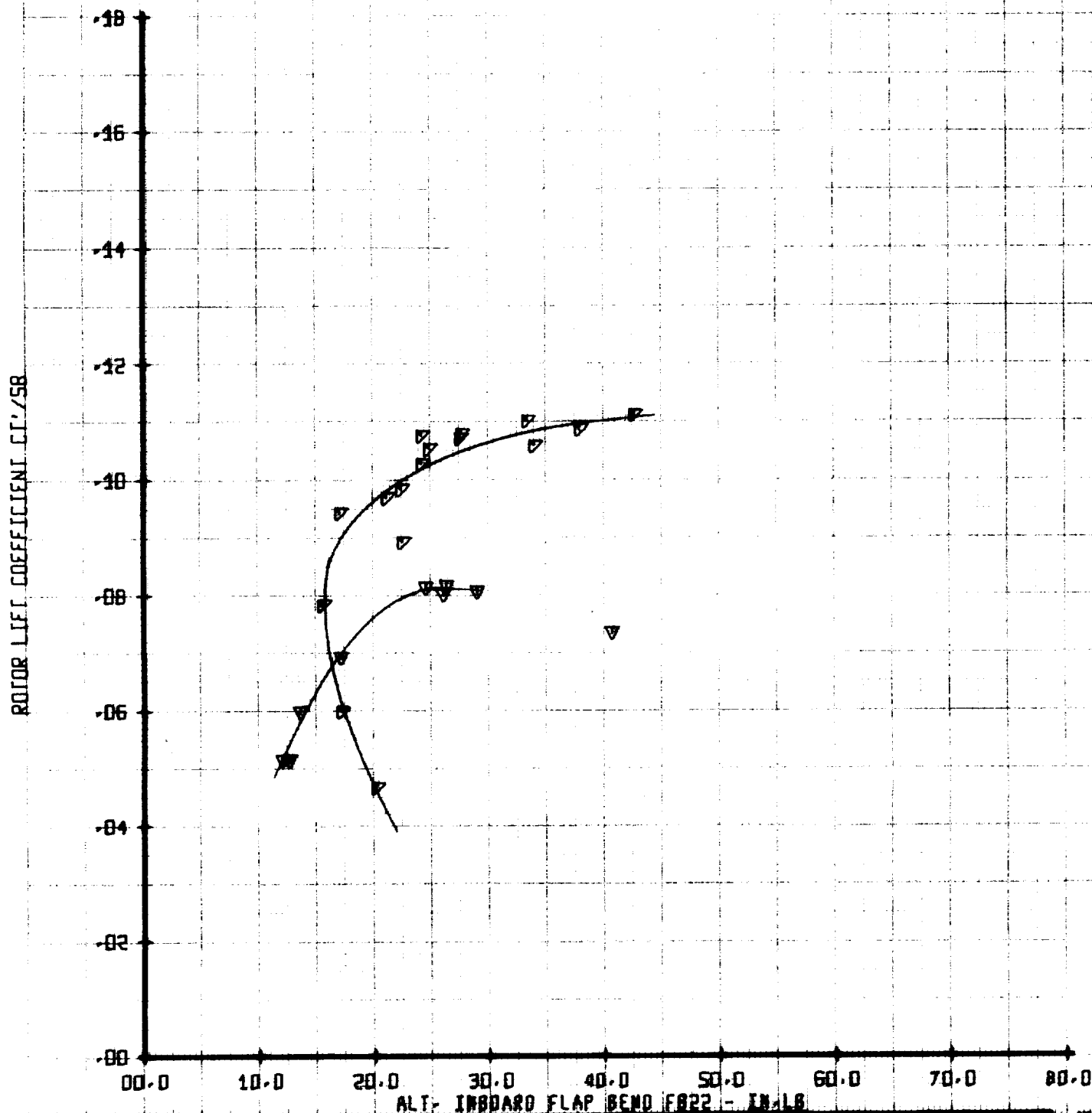


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	40	.50	.025	310
△	39	.50	.05	310
▽	41	.50	.10	310
△	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING INBOARD FLAP BENDING FB22



LIFT-PROPULSIVE FORCE LIMIT TEST

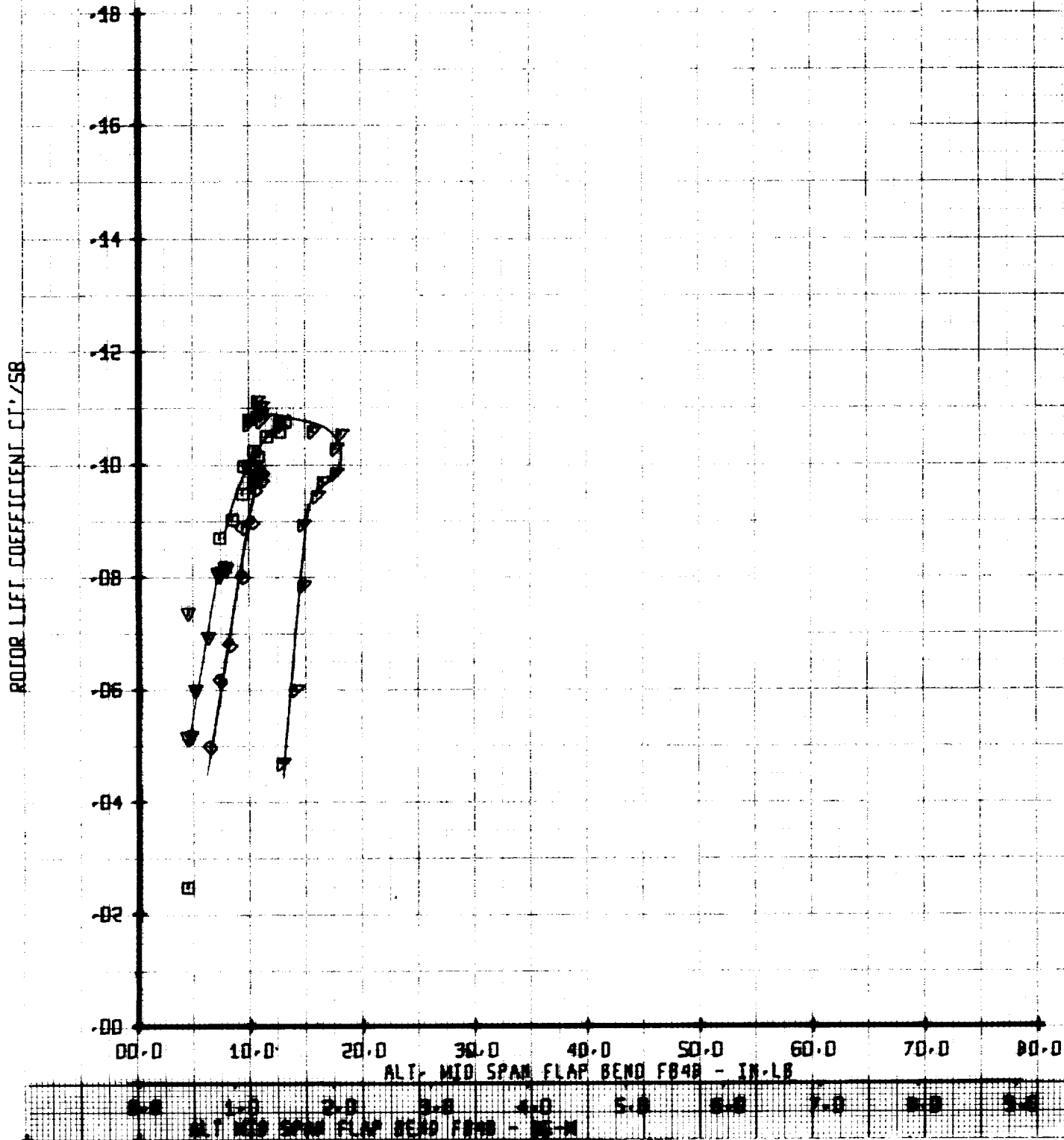
1/10 SCALE OH-42B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
○	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN FLAP BENDING FB48

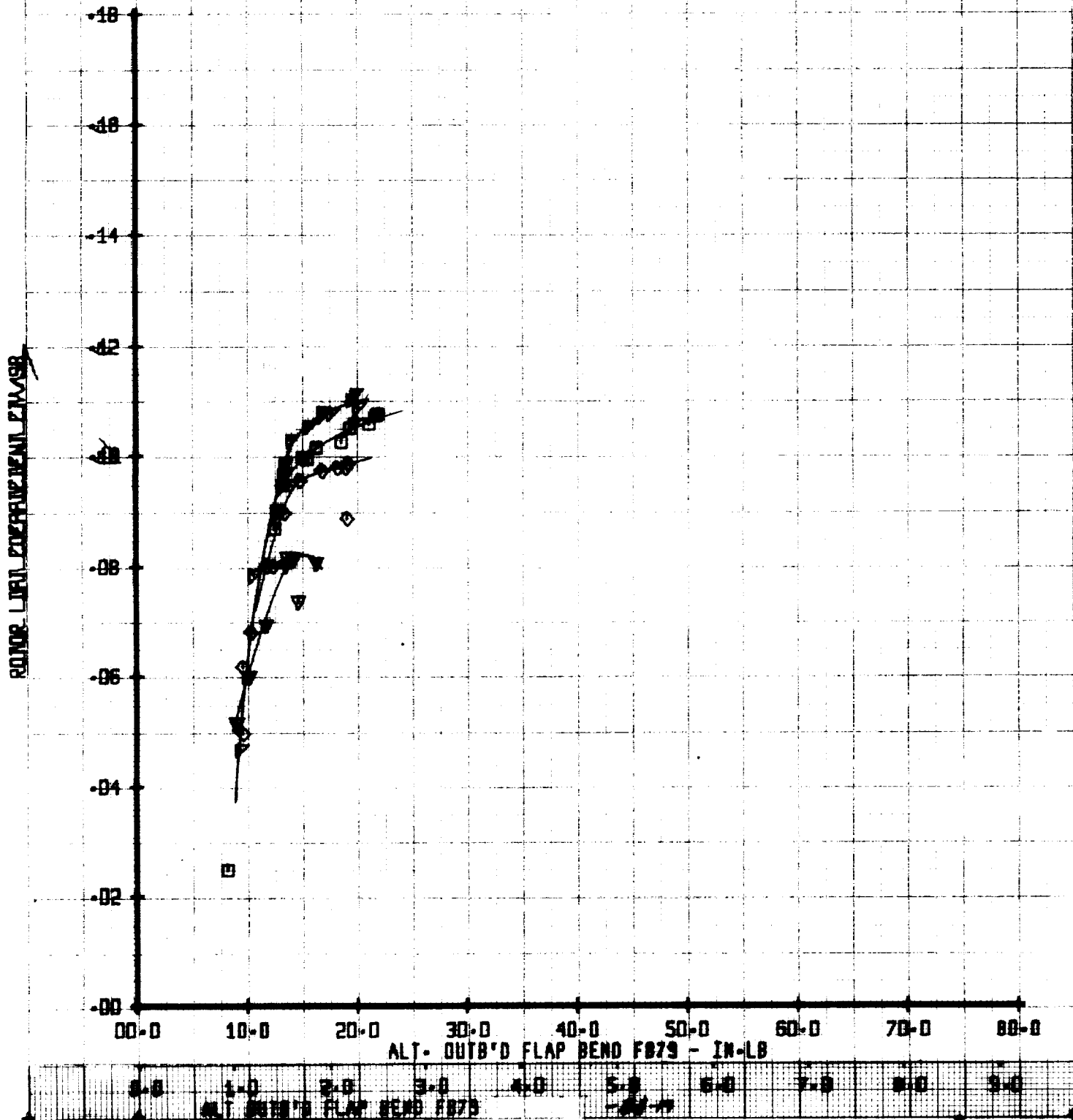


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI	X/00258	VTUN
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD FLAP BENDING FB79

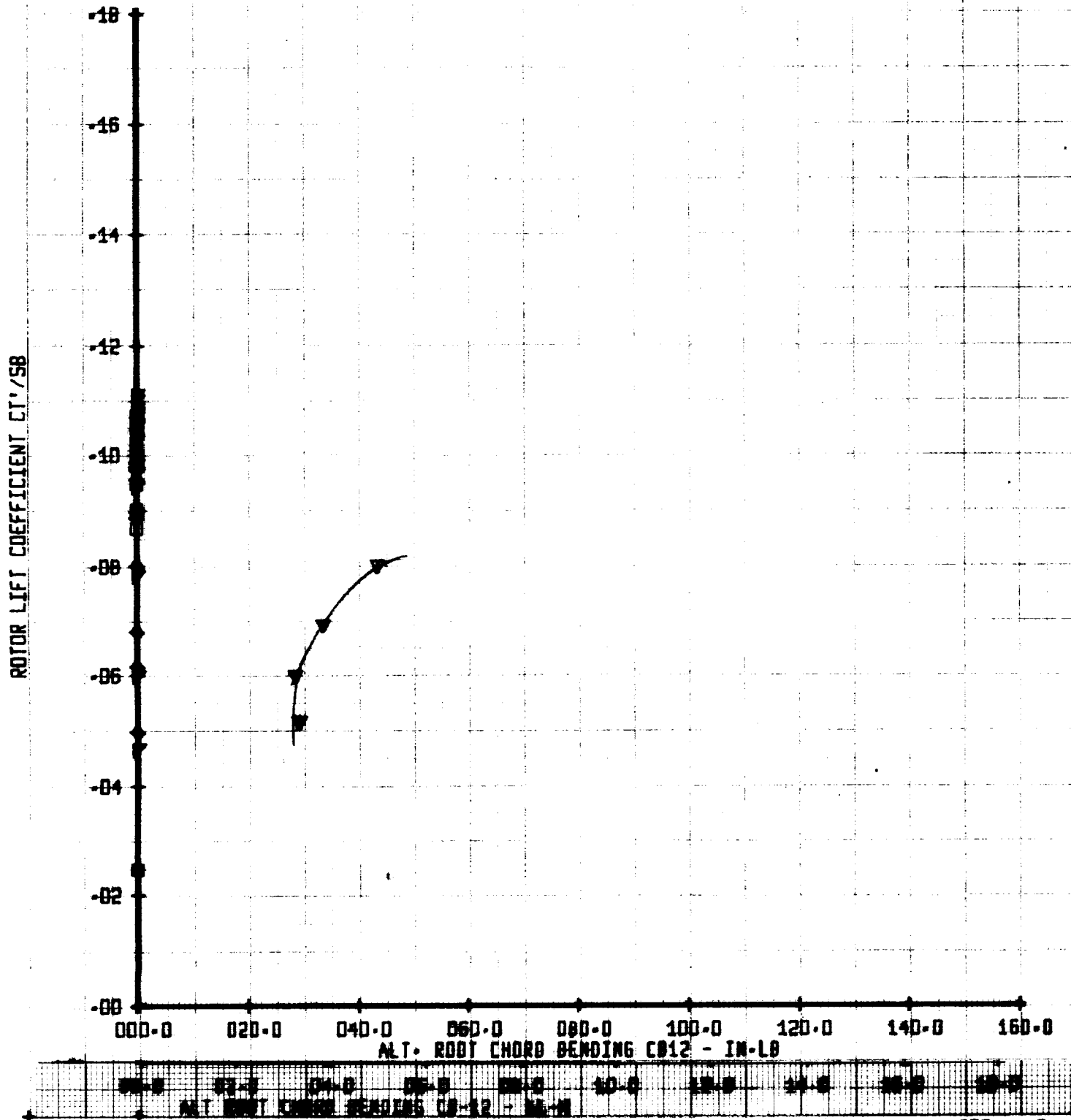


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

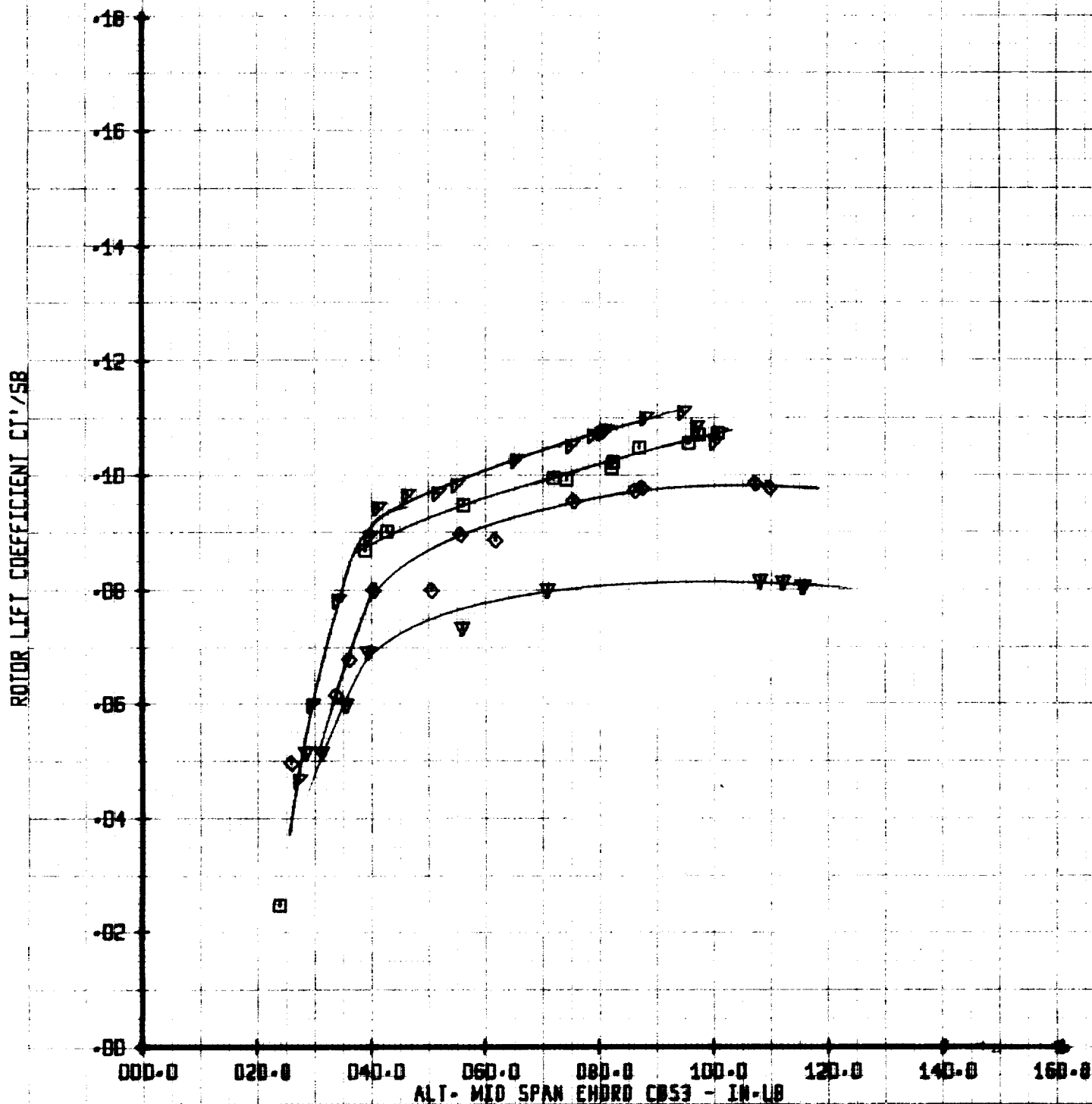


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/DO2SB	VTUN
□	40	.50	.025	310
▽	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN CHORD CB53



LIFT-PROPULSIVE FORCE LIMIT TEST

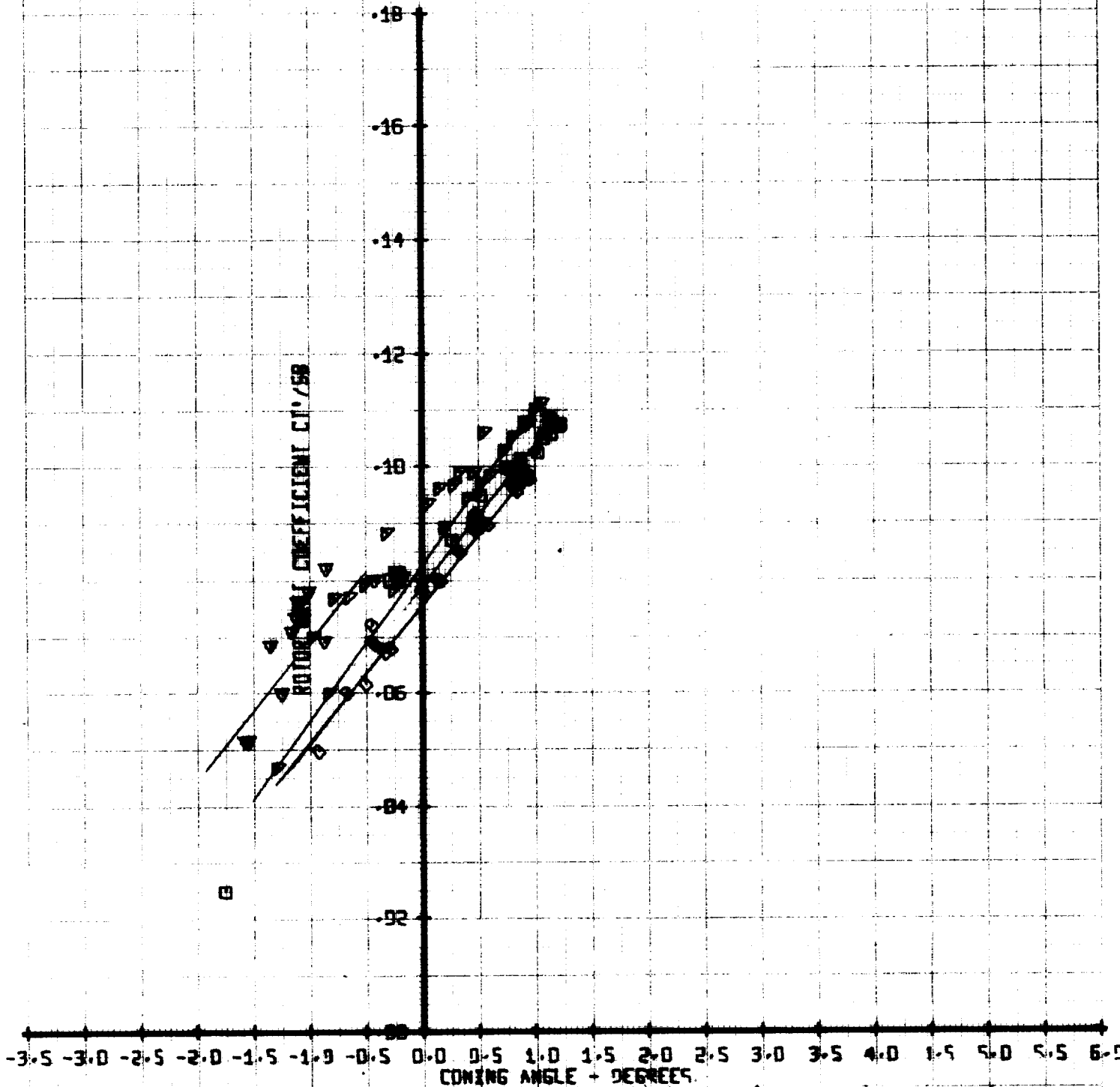
1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/DD258	YTUN
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
CONING ANGLE

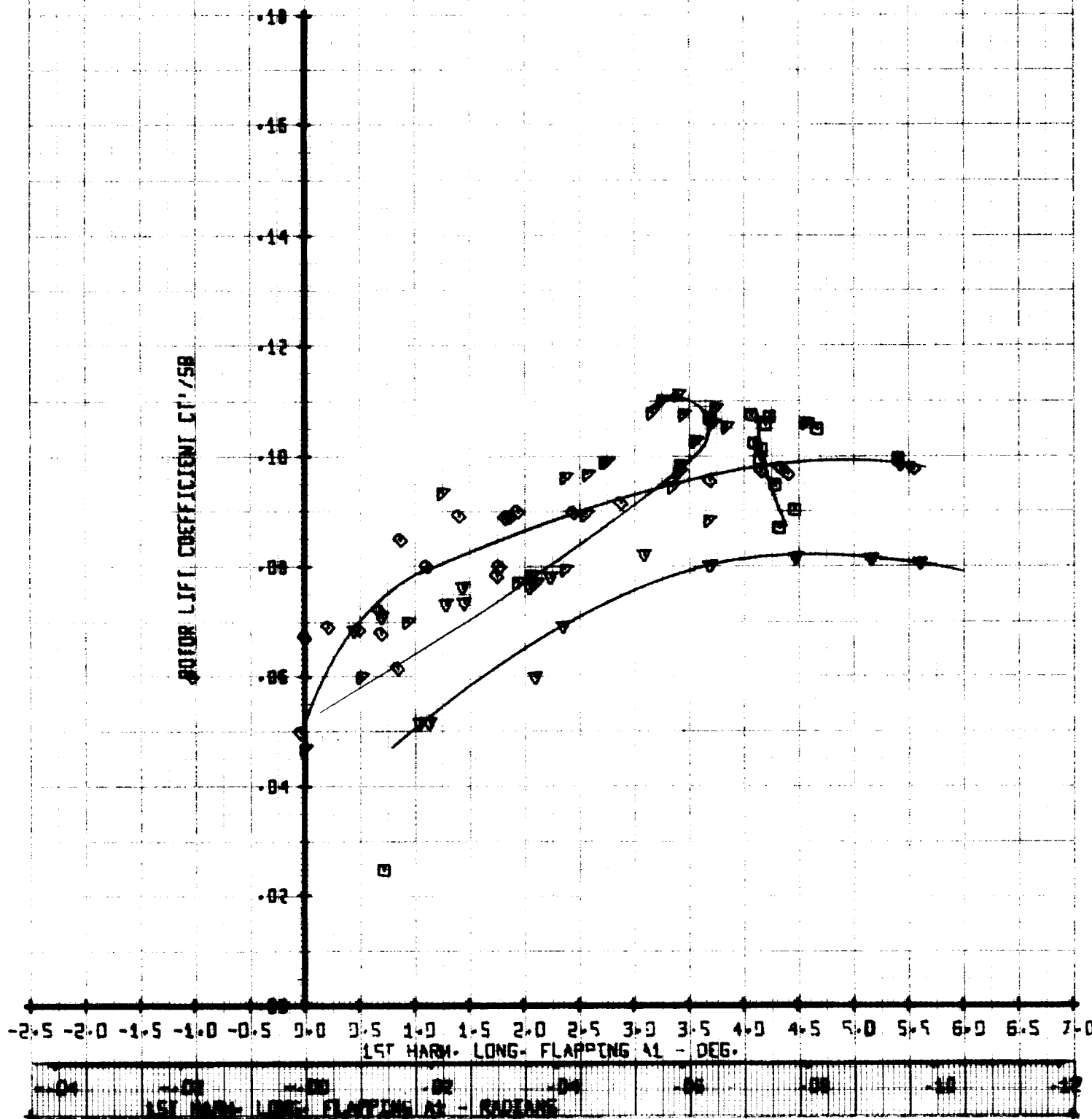


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47D ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1

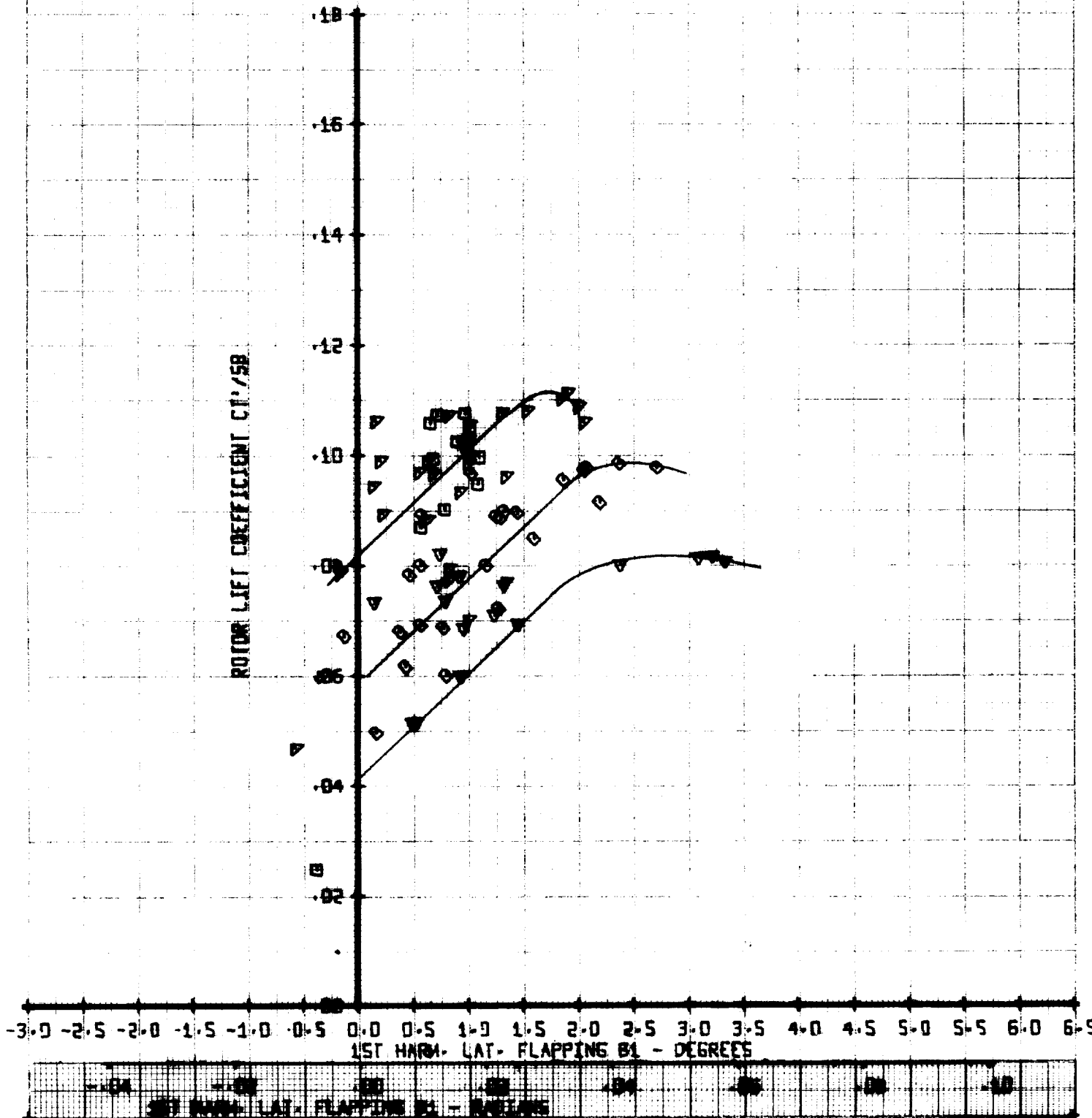


LEFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/RO258	VTUN
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

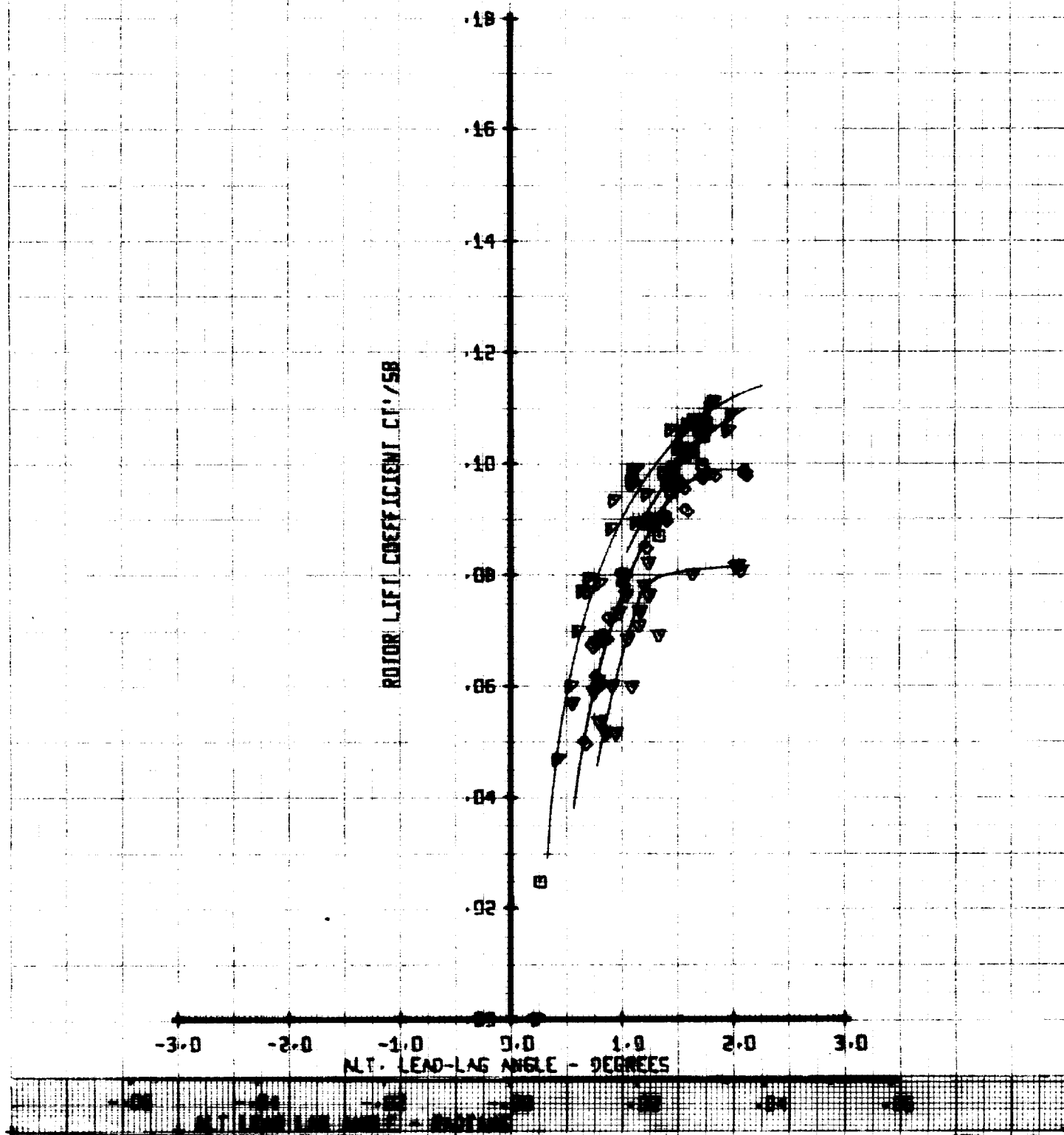


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-470 ROTOR
LIFT LIMIT TESTING

LEGEND

S/M	RUN	MU*	X/DD258	Y/TUM
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE



LIFT-PROPULSIVE FORCE LIMIT TEST

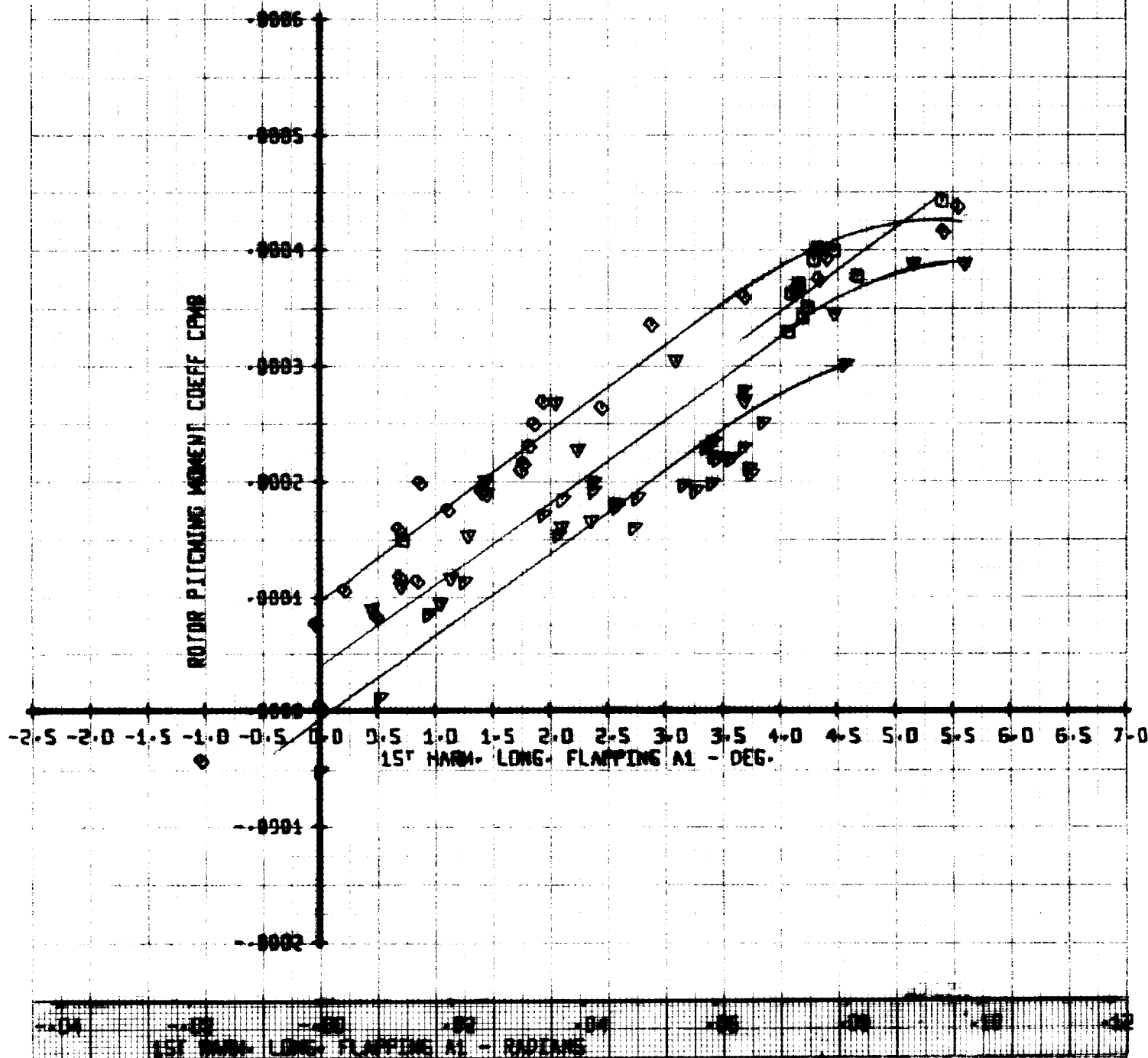
1/12 SCALE OH-47A ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1



LIFT-PROPULSIVE FORCE LIMIT TEST
1:10 SCALE OH-47D ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	40	.50	.025	310
△	39	.50	.05	310
◇	41	.50	.10	310
▽	42	.50	.20	310

ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

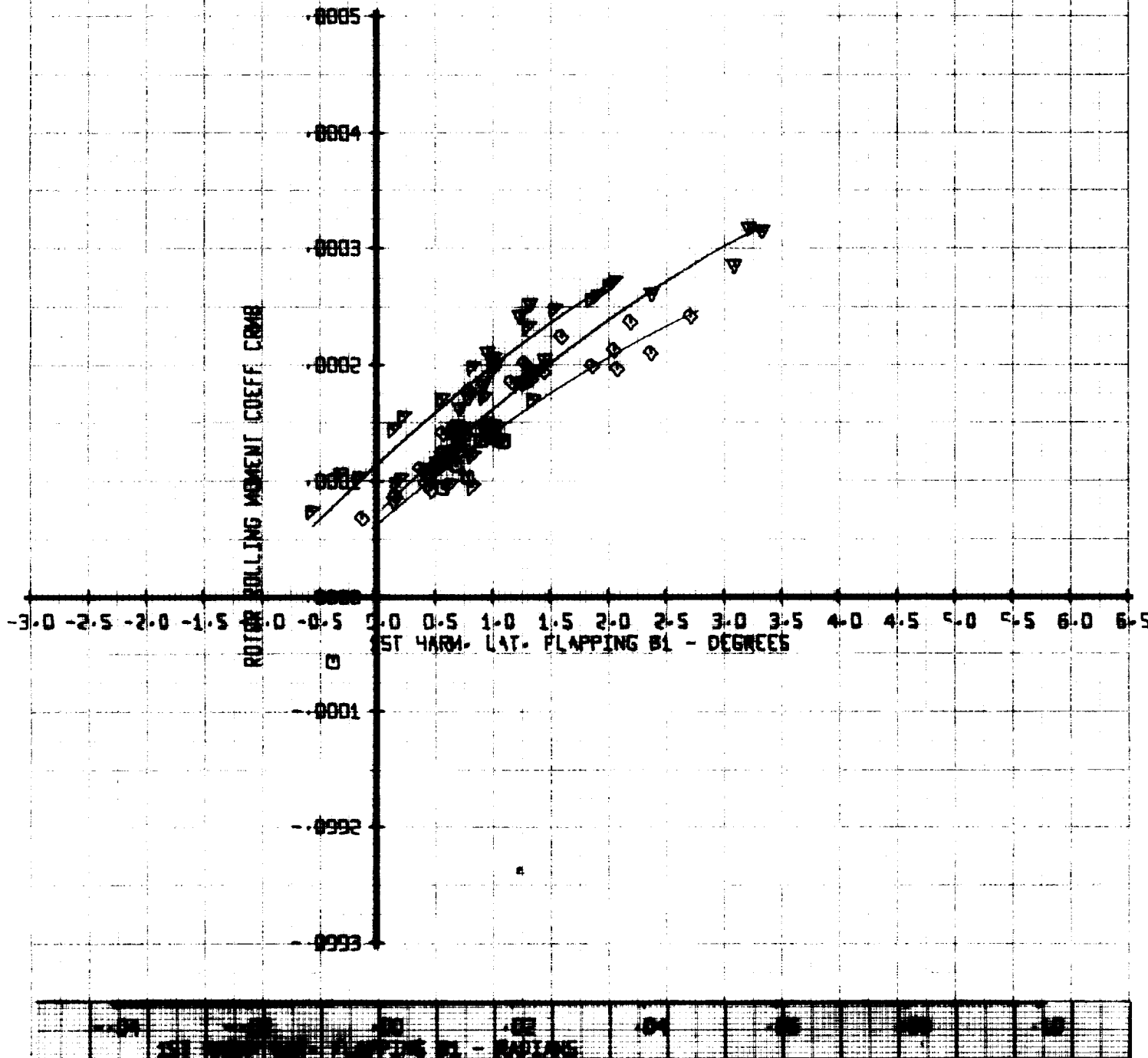


Figure A-134

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTIN
□	51	.58	.025	329
△	50	.58	.05	329
◇	52	.58	.10	329
▽	53	.58	.20	329

ROTOR LIFT COEFFICIENT
 VERSUS
 ROTOR PROPULSIVE FORCE COEFFICIENT

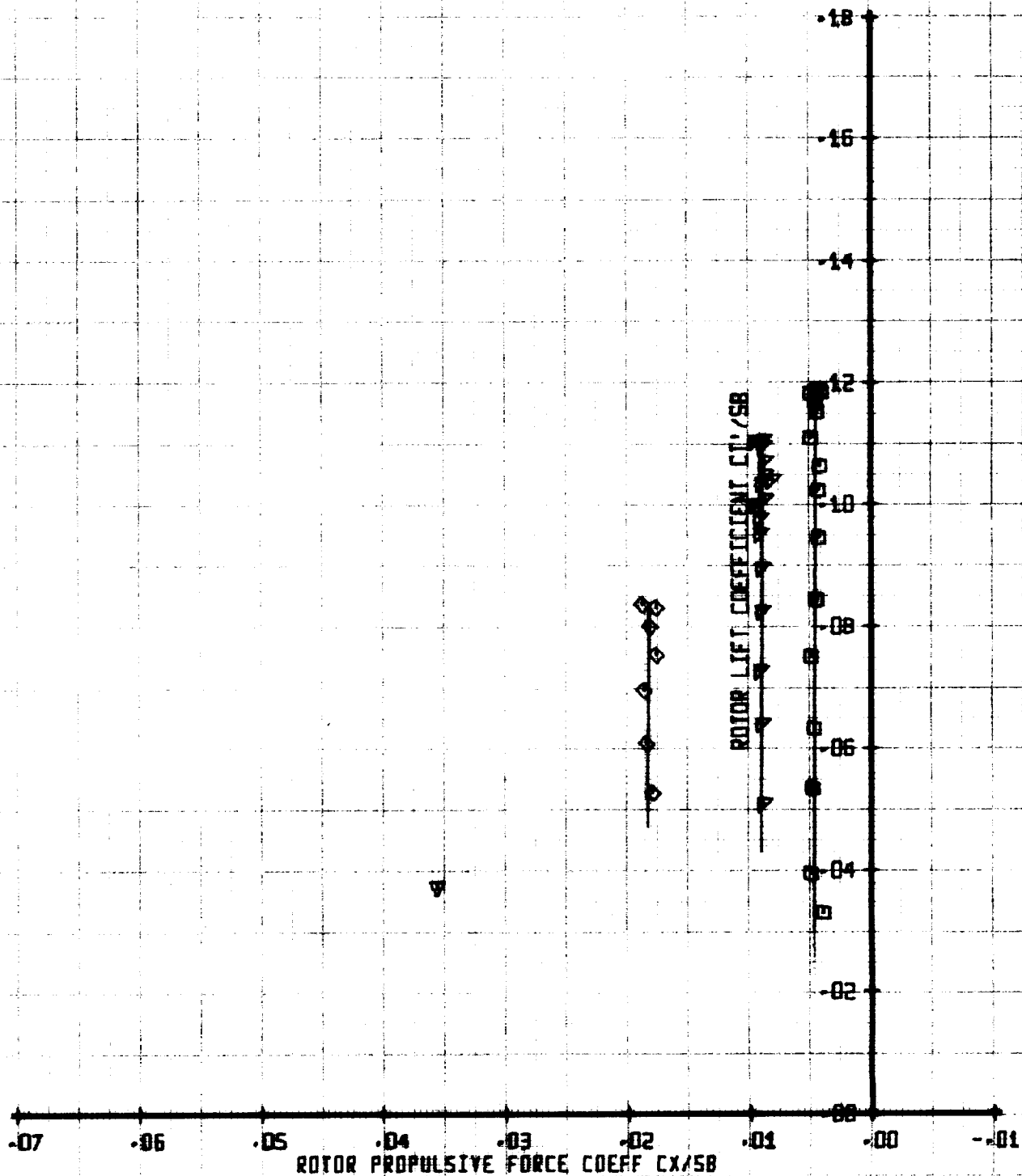


Figure A-135

LIFT-PROPULSIVE FORCE LIMIT TEST

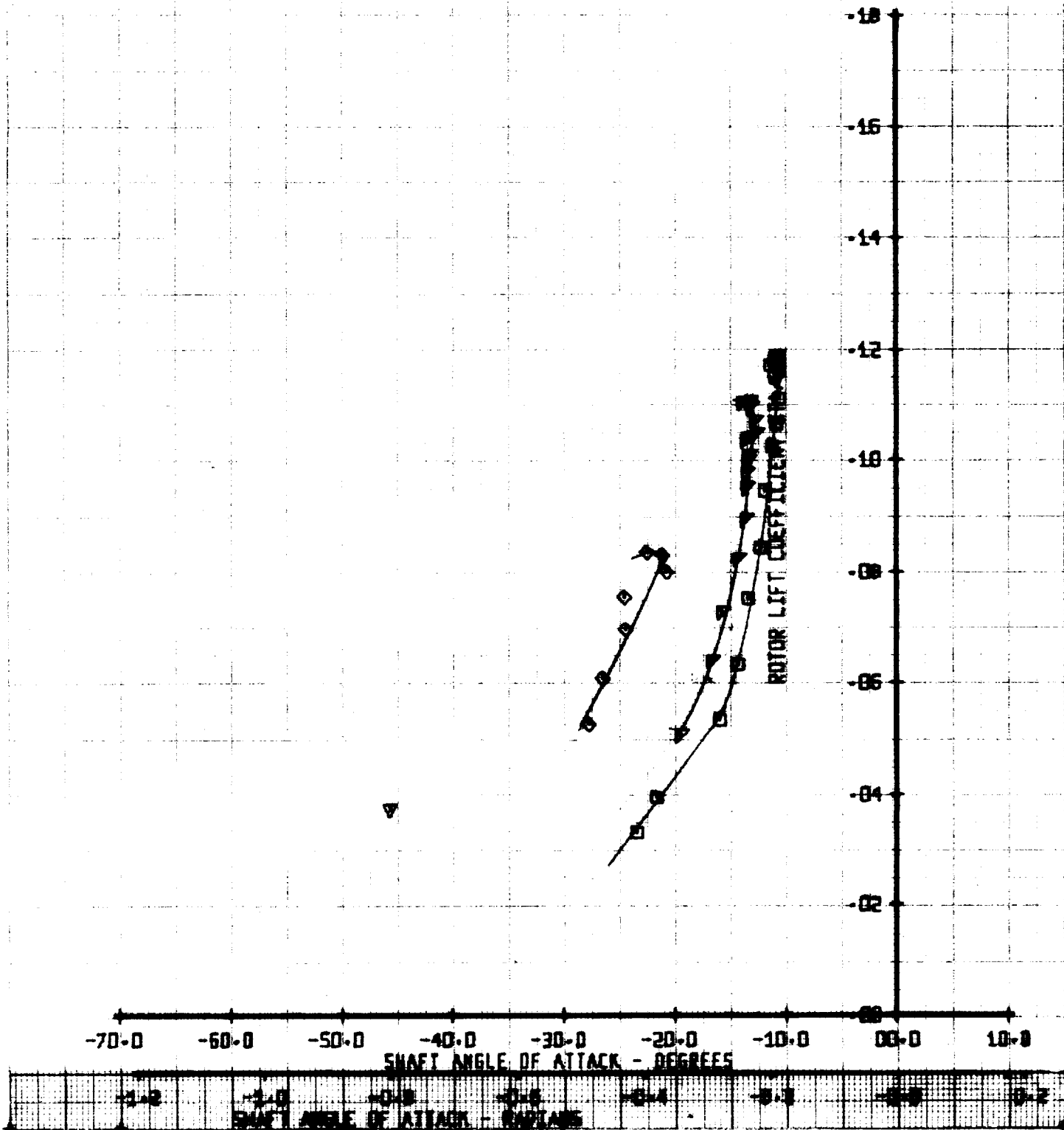
1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/DOZSB	VTUN
▲	51	.59	.0258	329
◊	52	.59	.0525	329
◻	53	.59	.1615	329
▼	53	.59	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK



LIFT-PROPULSIVE FORCE LIMIT TEST

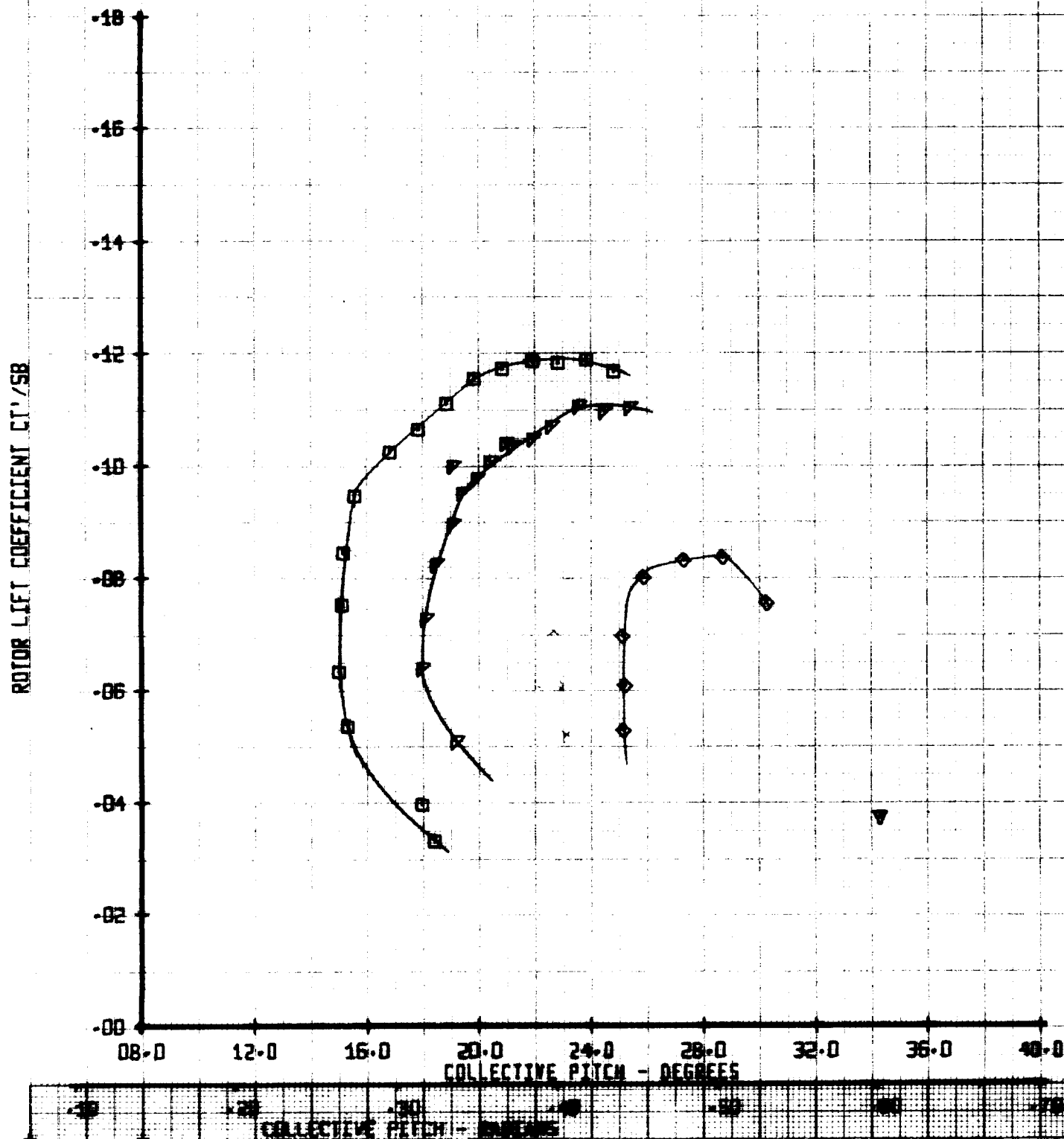
1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML	X/00258	WTUN
□	51	.53	.05	323
△	52	.53	.05	323
◇	53	.53	.20	323

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	51	.59	.025	329
△	50	.59	.05	329
◇	52	.59	.10	329
▽	53	.59	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
LONGITUDINAL CYCLIC

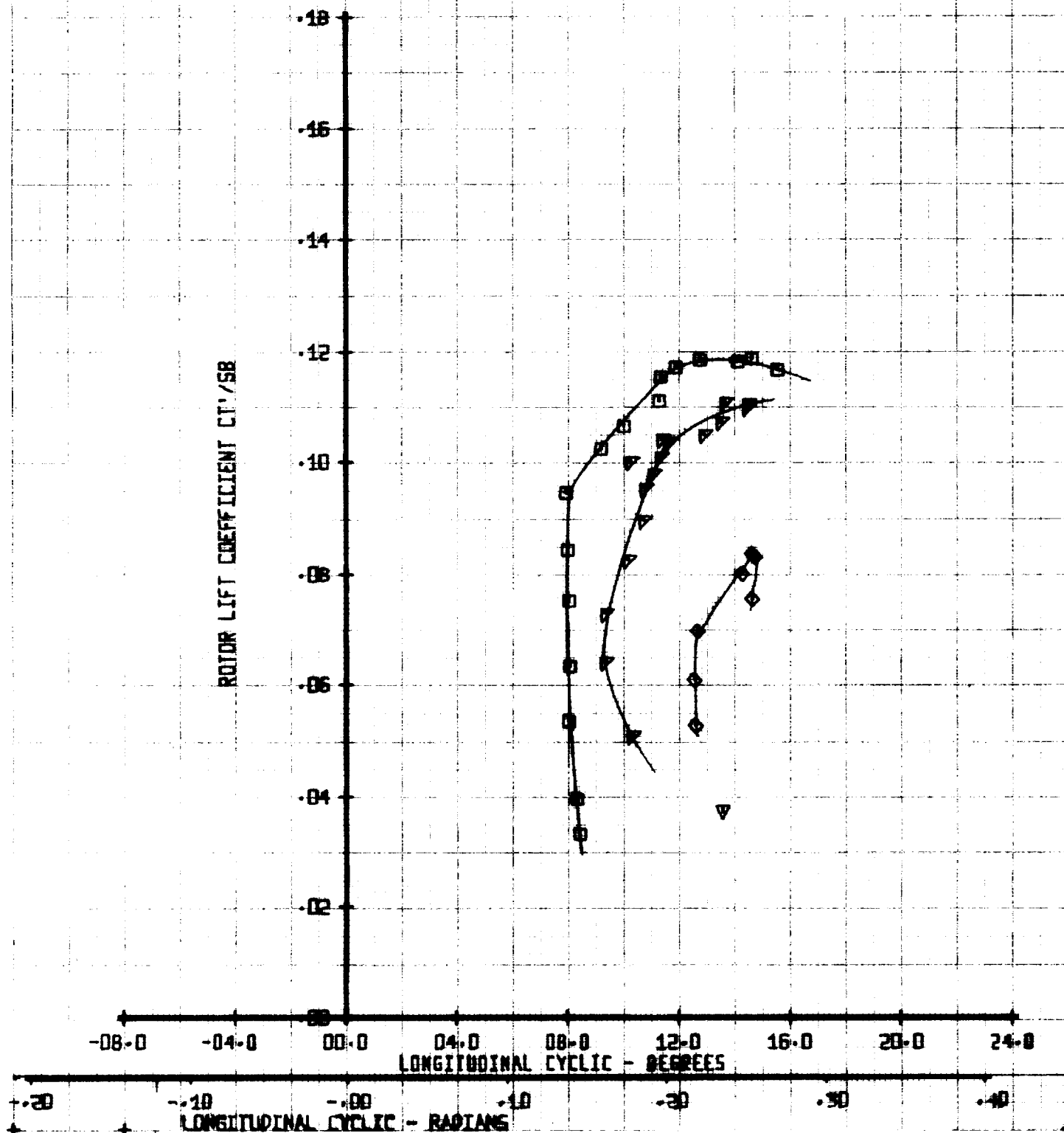


Figure A-138

LIFT-PROPULSIVE FORCE LIMIT TEST

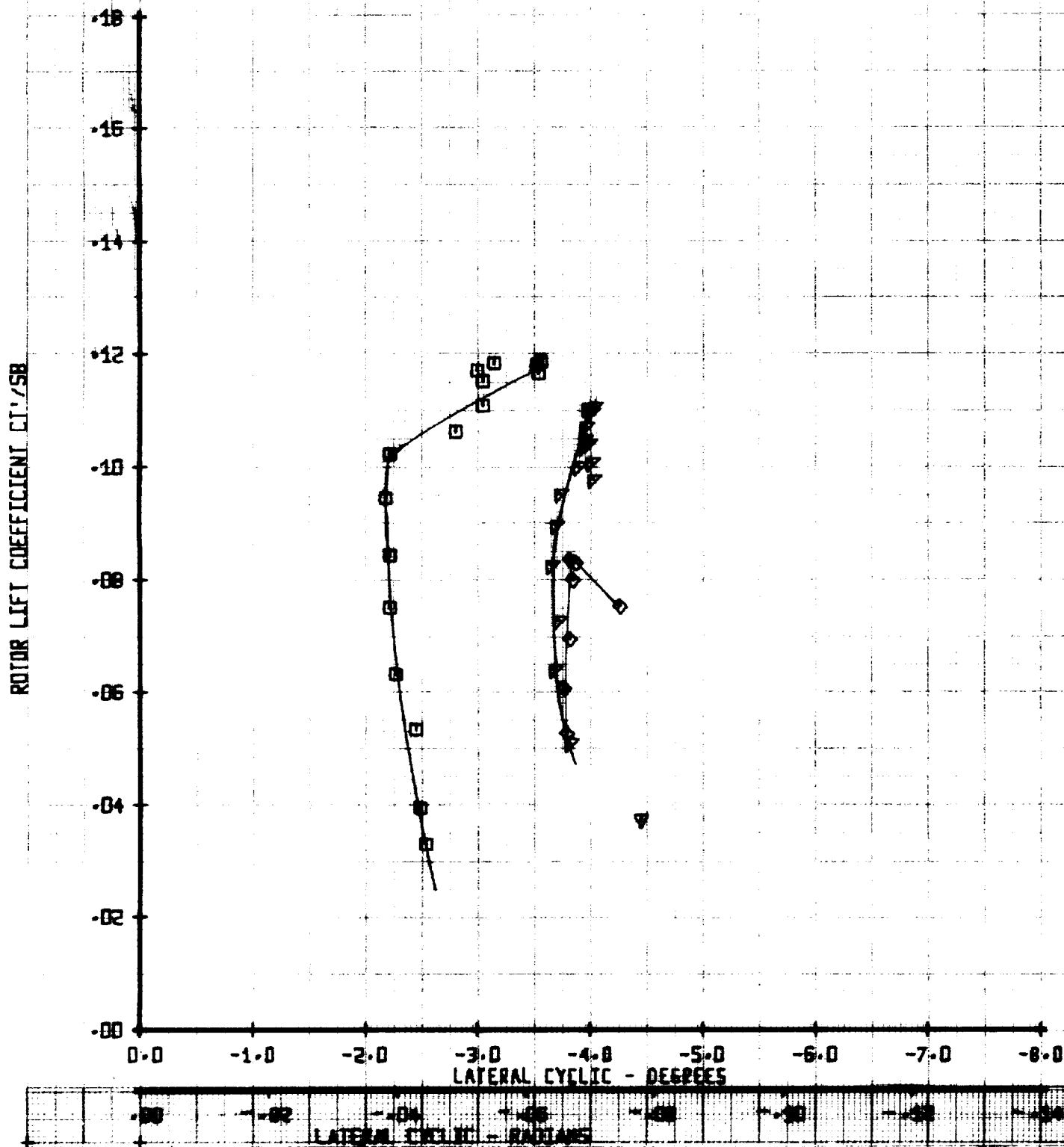
1/10 SCALE CM-470 ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	51	.59	.025	329
△	50	.59	.05	329
◇	52	.59	.18	329
▽	53	.59	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
LATERAL CYCLIC

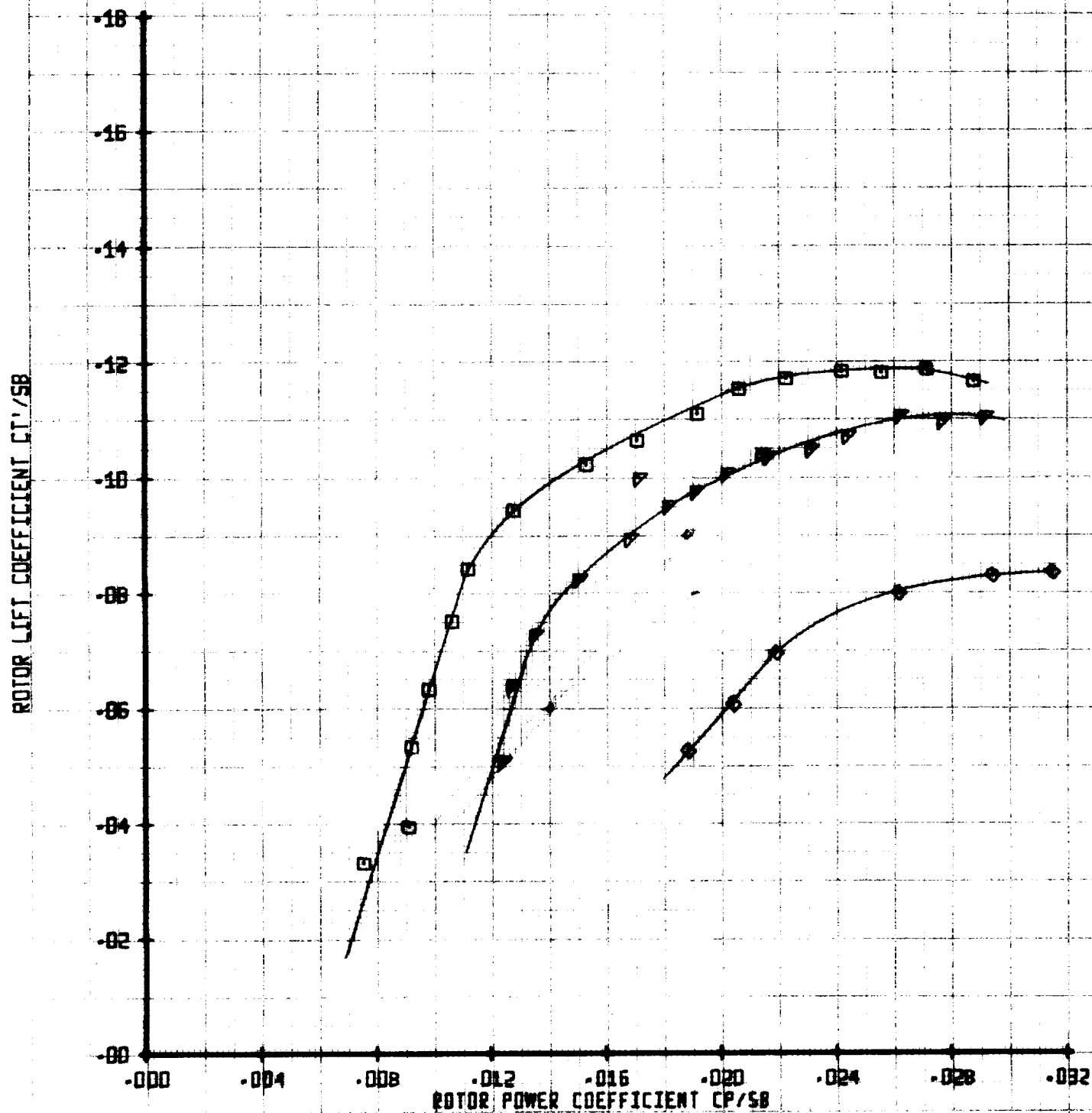


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	51	.53	.025	329
△	50	.53	.05	329
◇	52	.53	.10	329
▽	53	.53	.20	329

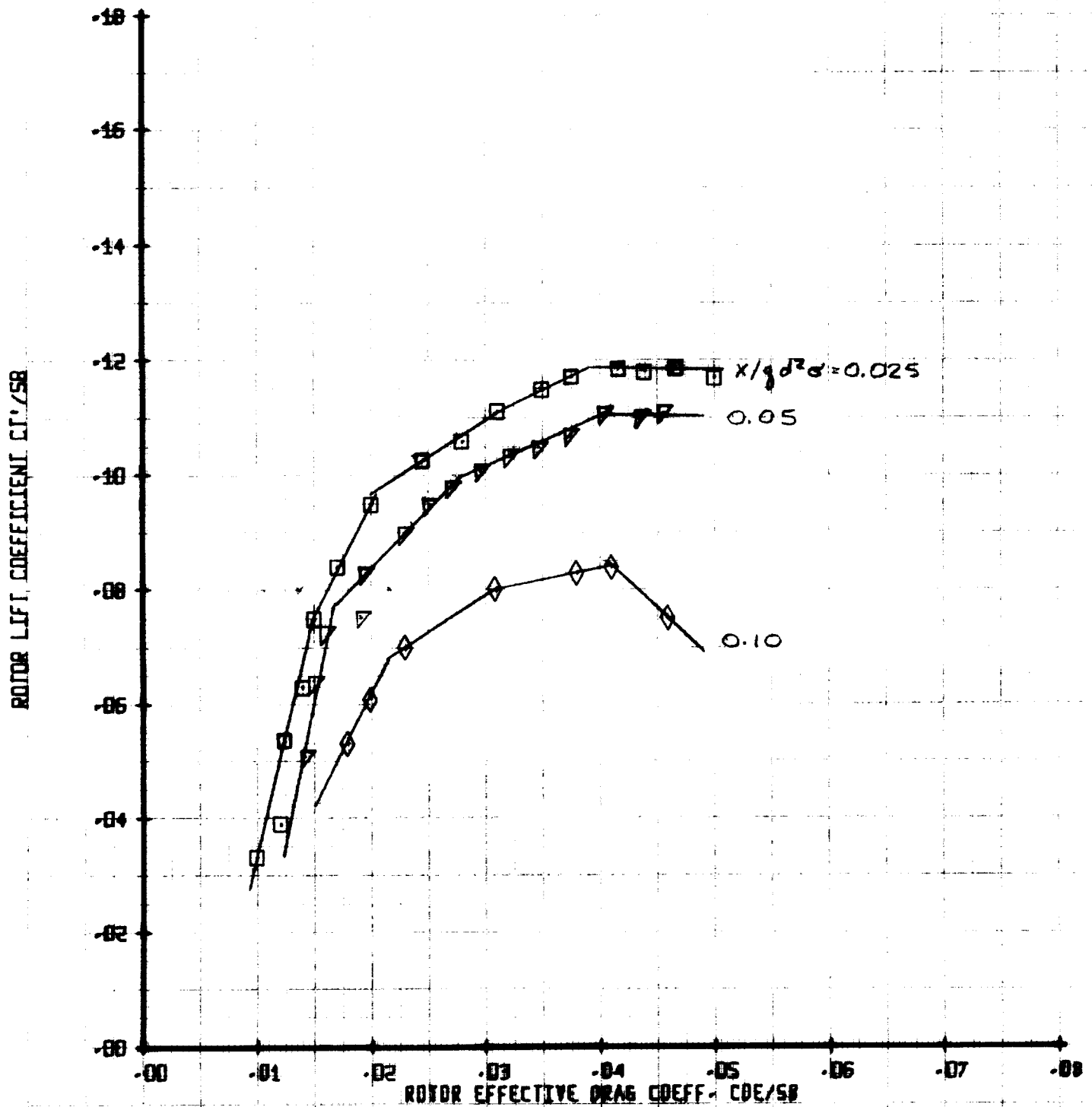
ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU'	X/100250	VTUN
□	51	.58	.025	329
△	50	.58	.05	329
◇	52	.58	.10	329
▽	53	.58	.20	329

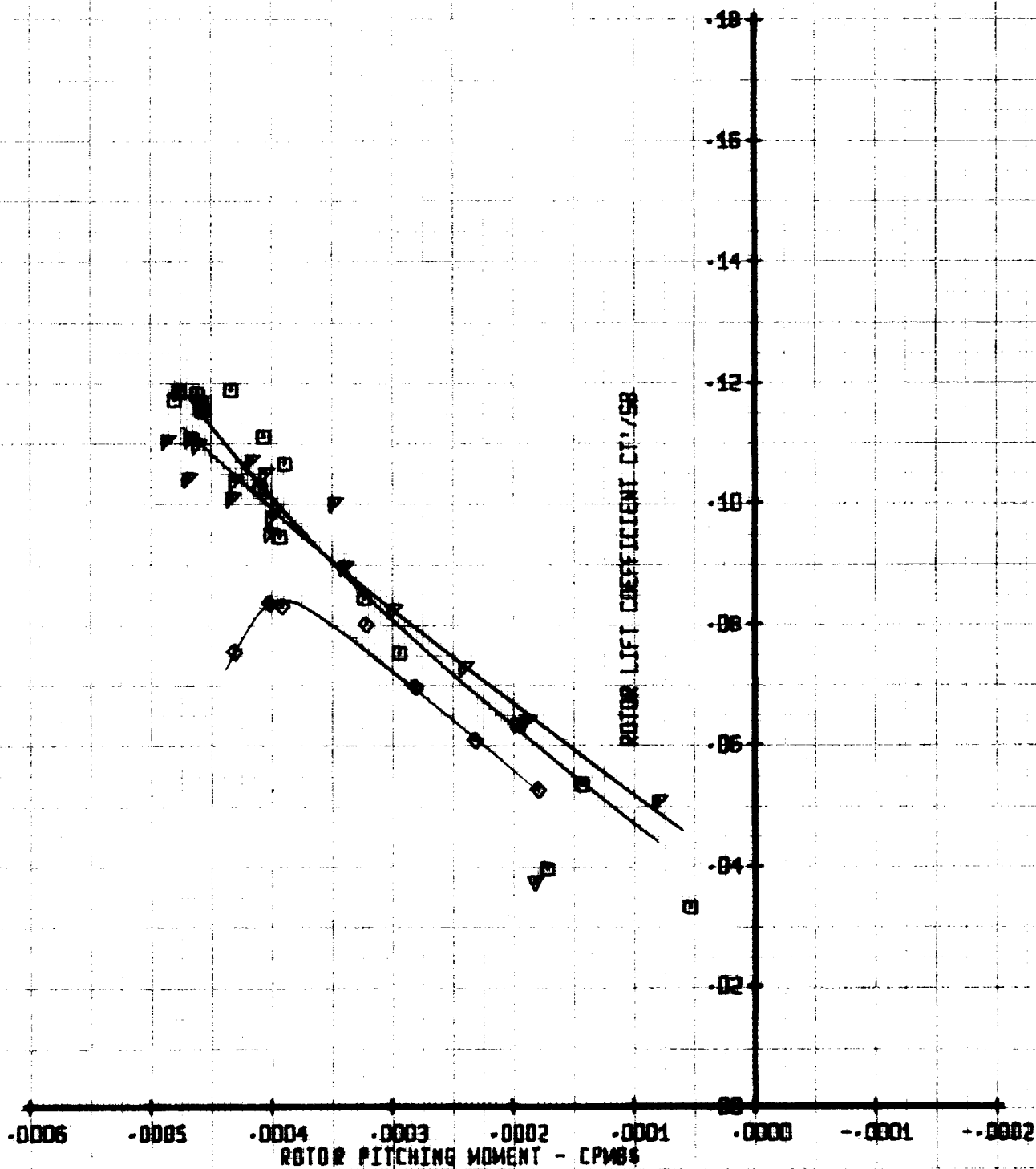
ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	YTUN
□	51	.53	.025	329
△	50	.52	.05	329
◇	52	.52	.10	329
▽	53	.53	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

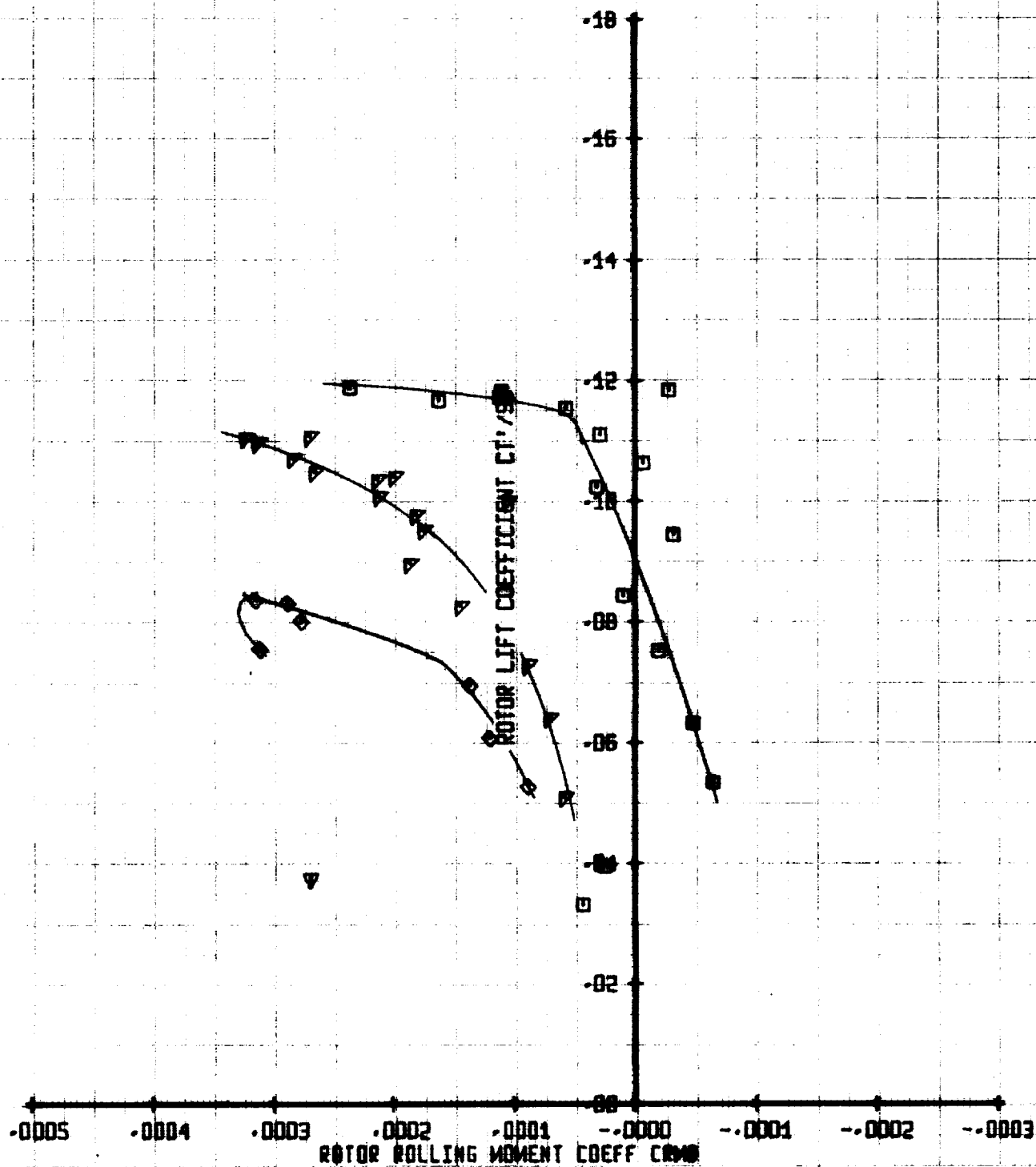


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00250	VTUN
□	51	.53	.025	329
△	50	.53	.025	329
◇	52	.53	.025	329
▽	53	.53	.025	329

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST

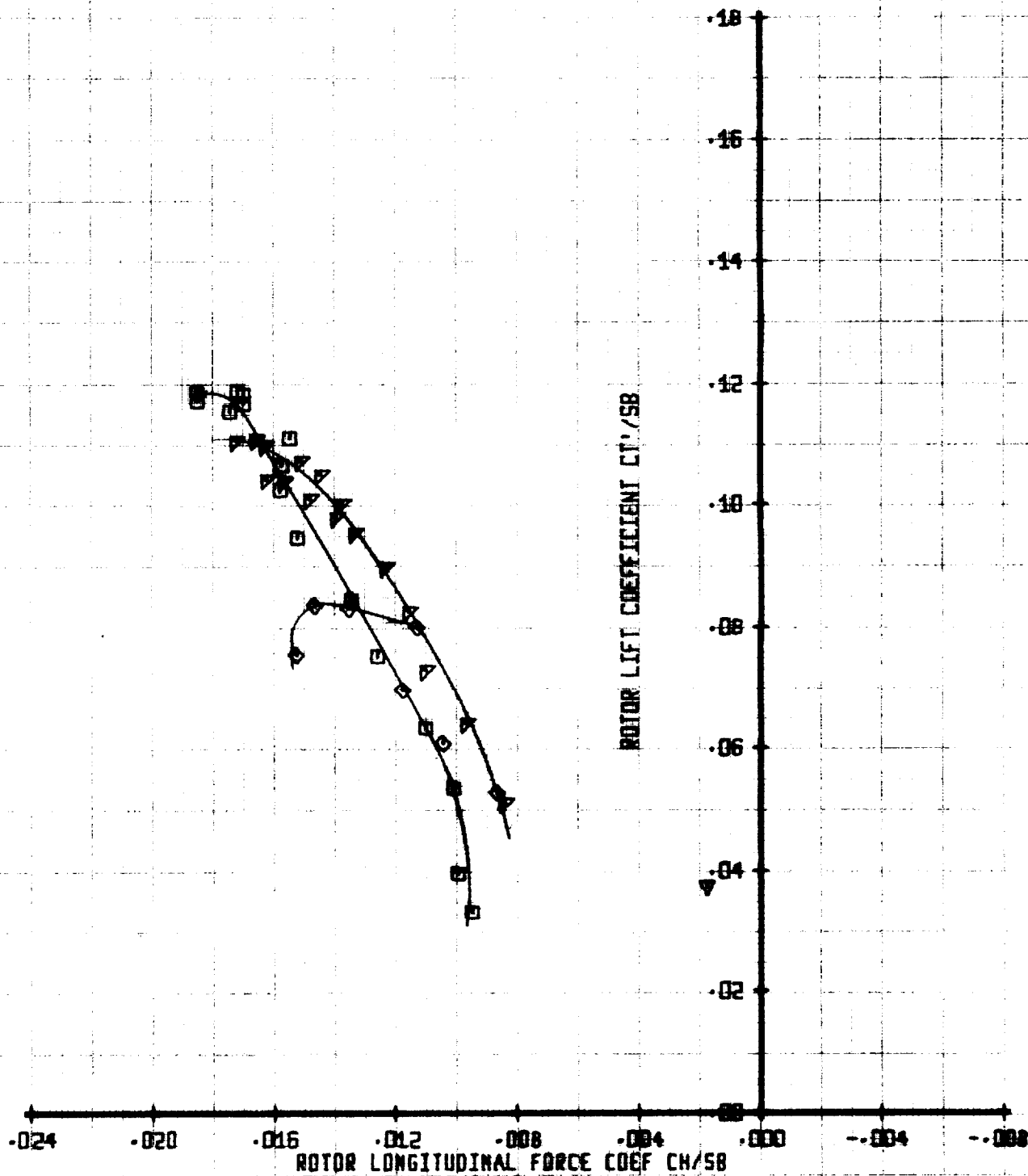
1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	51	.58	.025	329
△	50	.58	.05	329
◇	52	.58	.10	329
▽	53	.58	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
▲	1	.03	.025	329
△	2	.03	.05	329
□	3	.03	.10	329
○	4	.03	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT

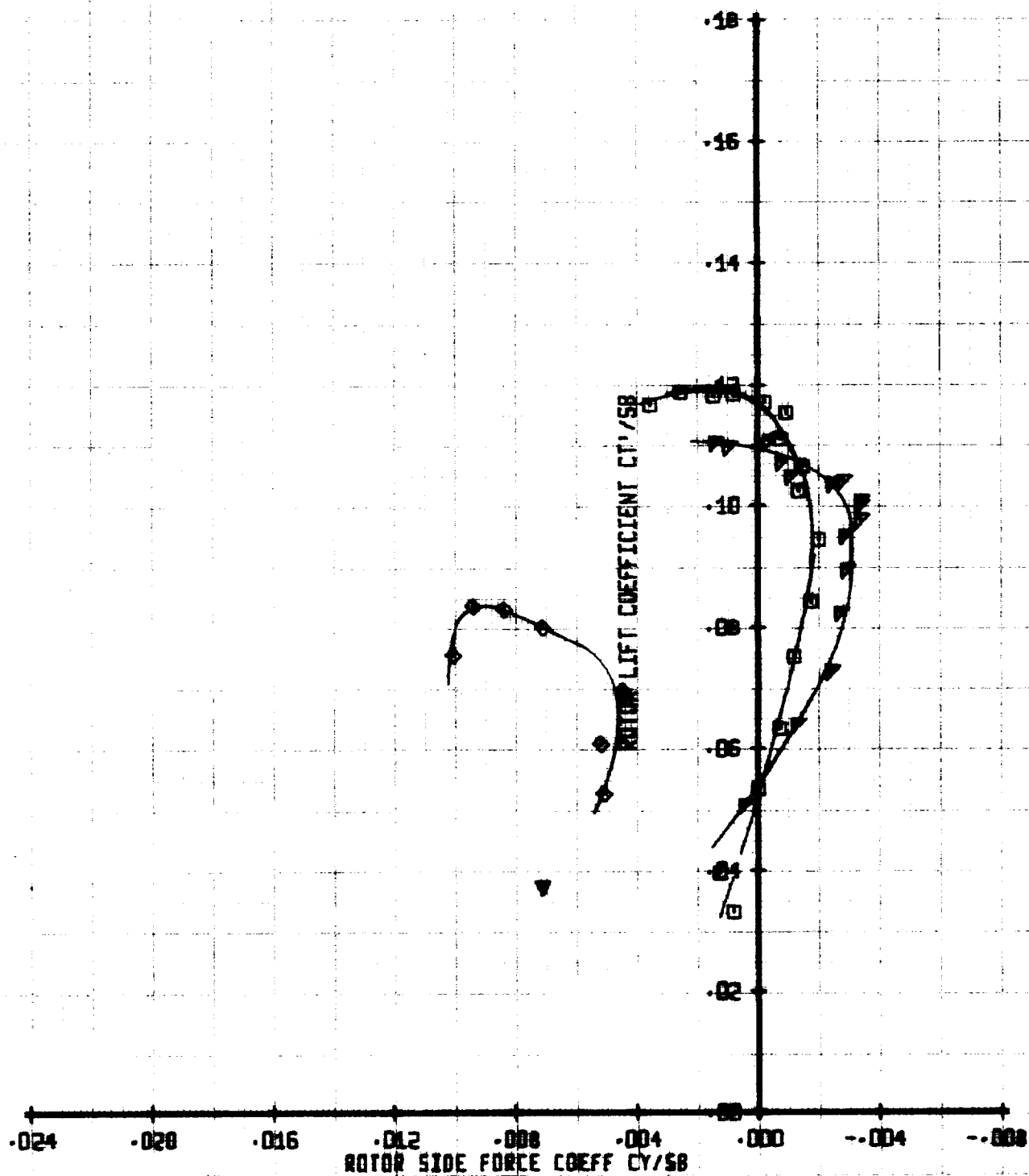


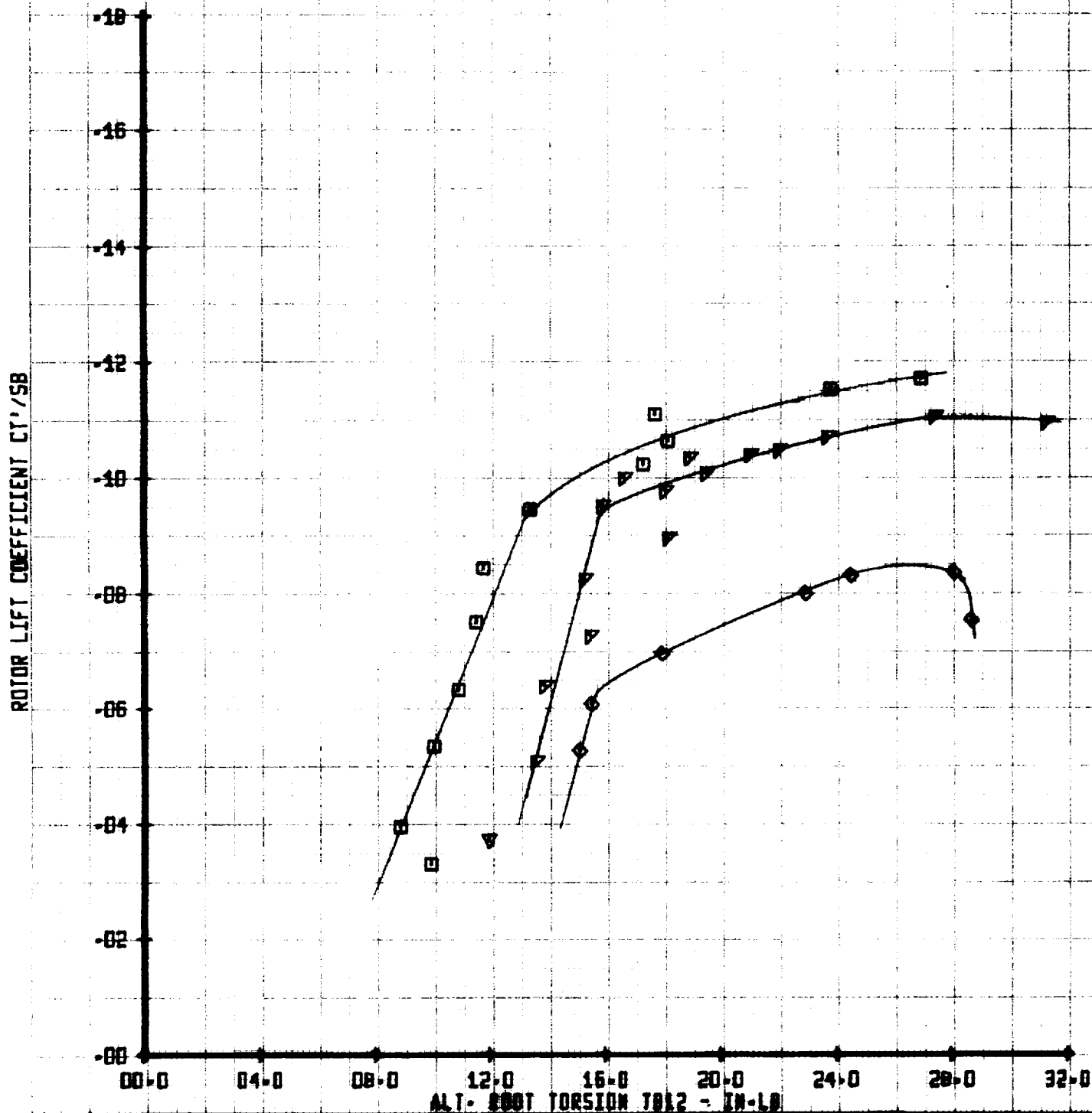
Figure A-145

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	51	.53	.025	329
▽	50	.53	.05	329
◆	52	.53	.10	329
▼	53	.53	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12



ALT. ROOT TORSION TB12 - IN-LB

ALT. ROOT TORSION TB12 - IN-LB

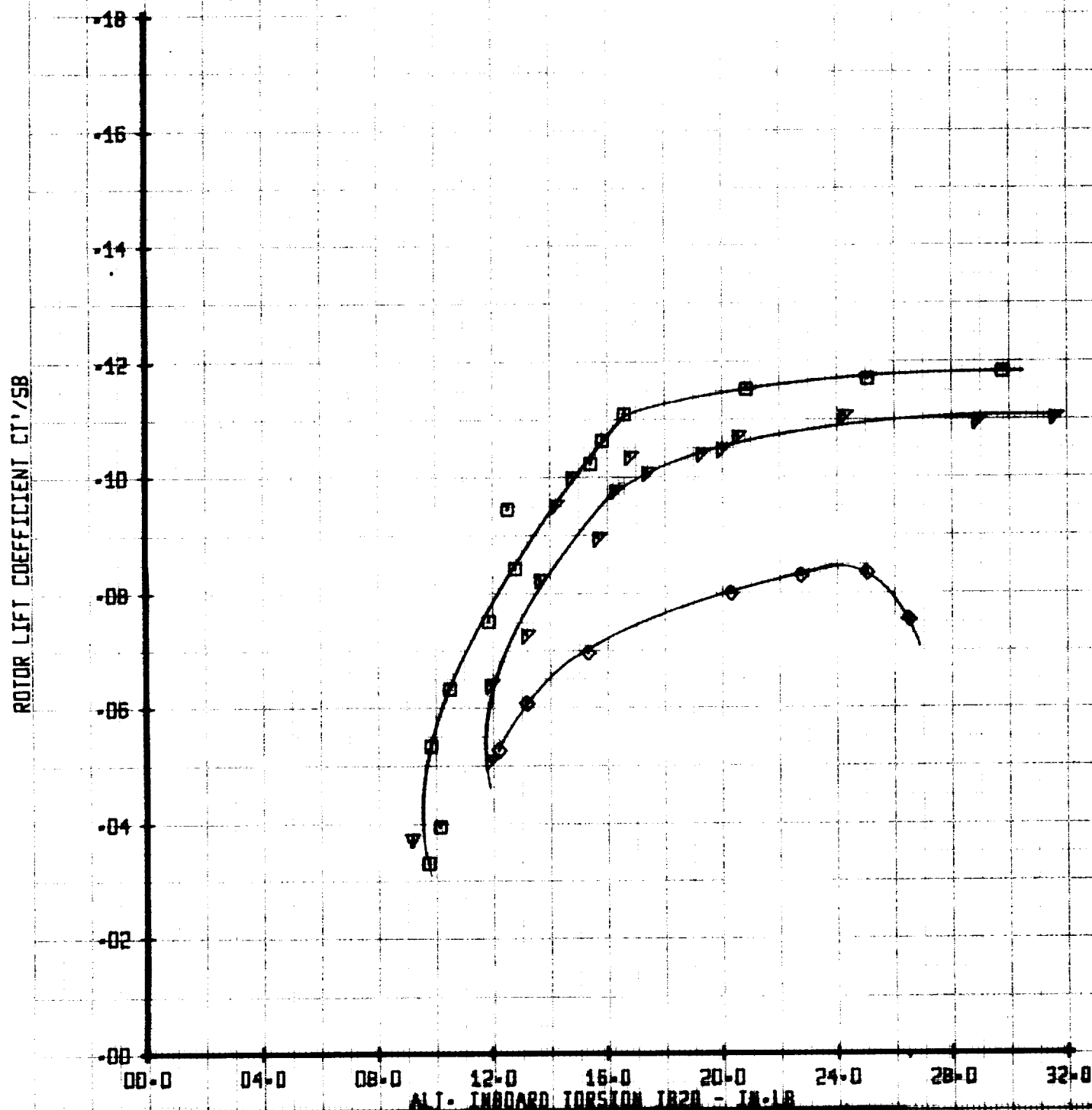
SET 7
BYWT 187

Figure A-146

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	VTUN
□	51	.53	.025	329
△	50	.53	.05	329
◇	52	.53	.10	329
▽	53	.53	.20	329

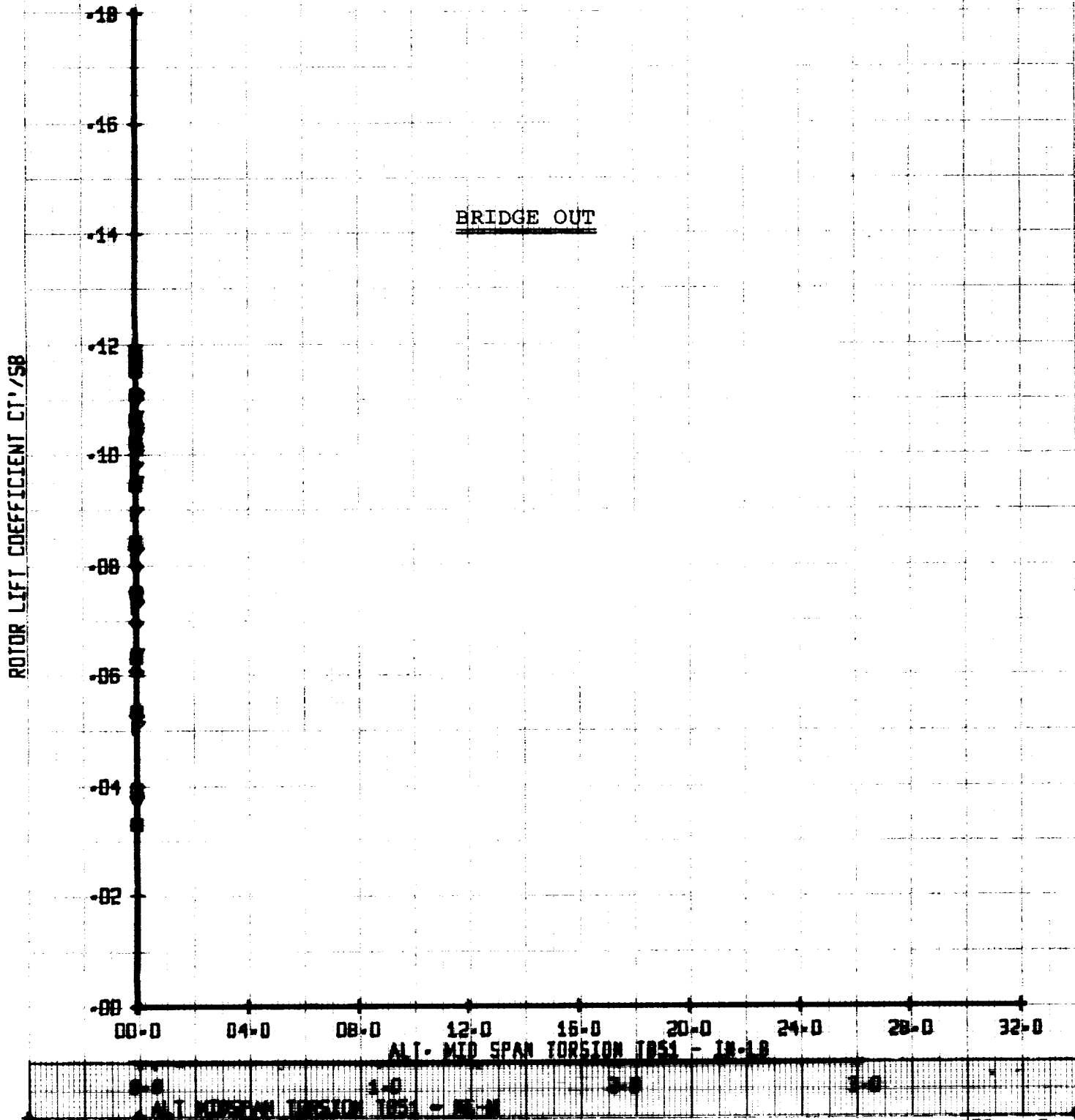
ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING INBOARD TORSION TB20



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	VTUN
□	51	.53	.025	329
△	52	.53	.05	329
◇	53	.53	.10	329
▽	53	.53	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB51



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/0025B	VTUN
□	51	.58	.025	329
▲	50	.58	.05	329
◆	52	.58	.18	329
▼	53	.58	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB81

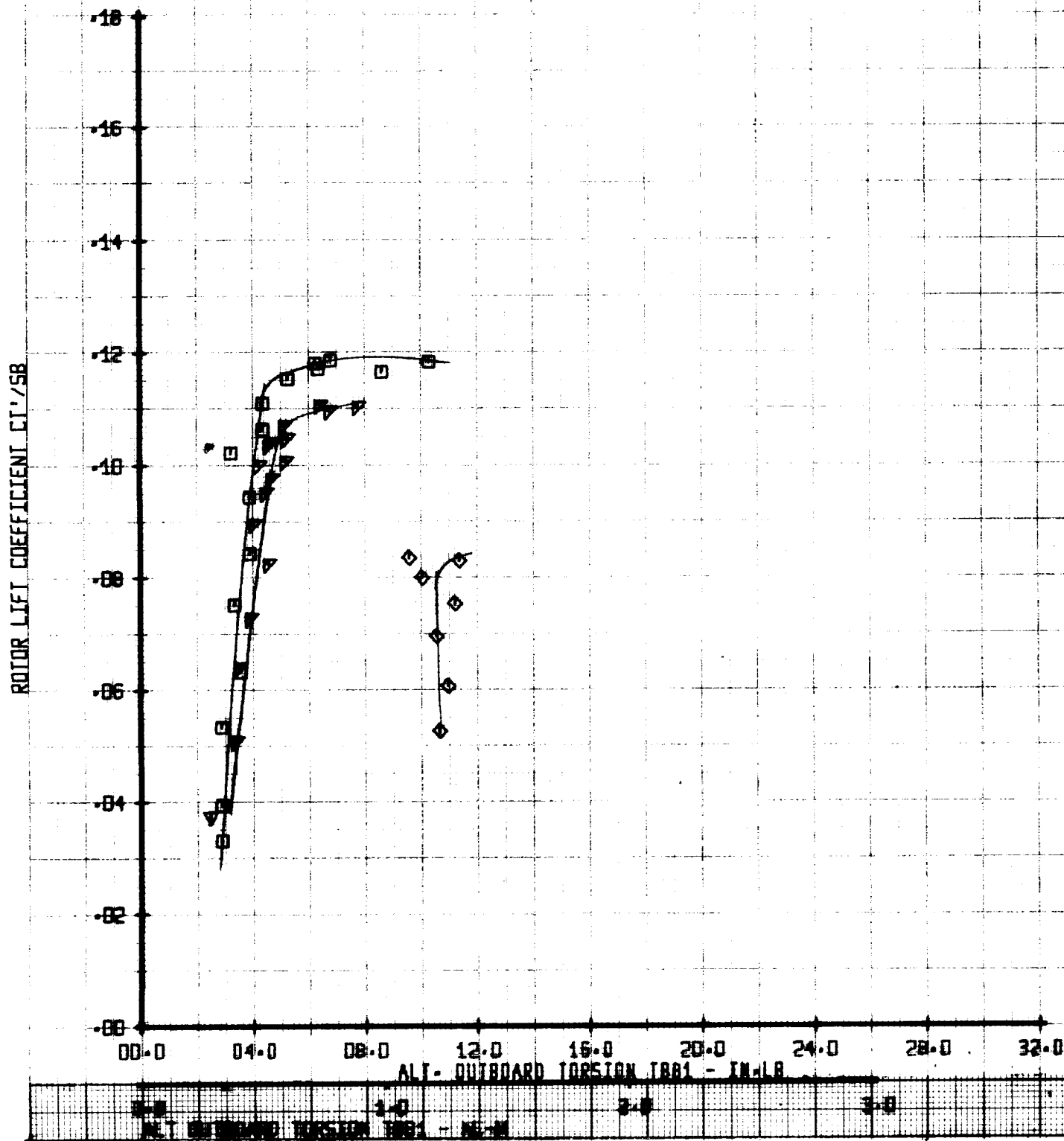


Figure A-149

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	51	.53	.025	329
▽	50	.53	.05	329
◆	52	.53	.10	329
▼	53	.53	.20	

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

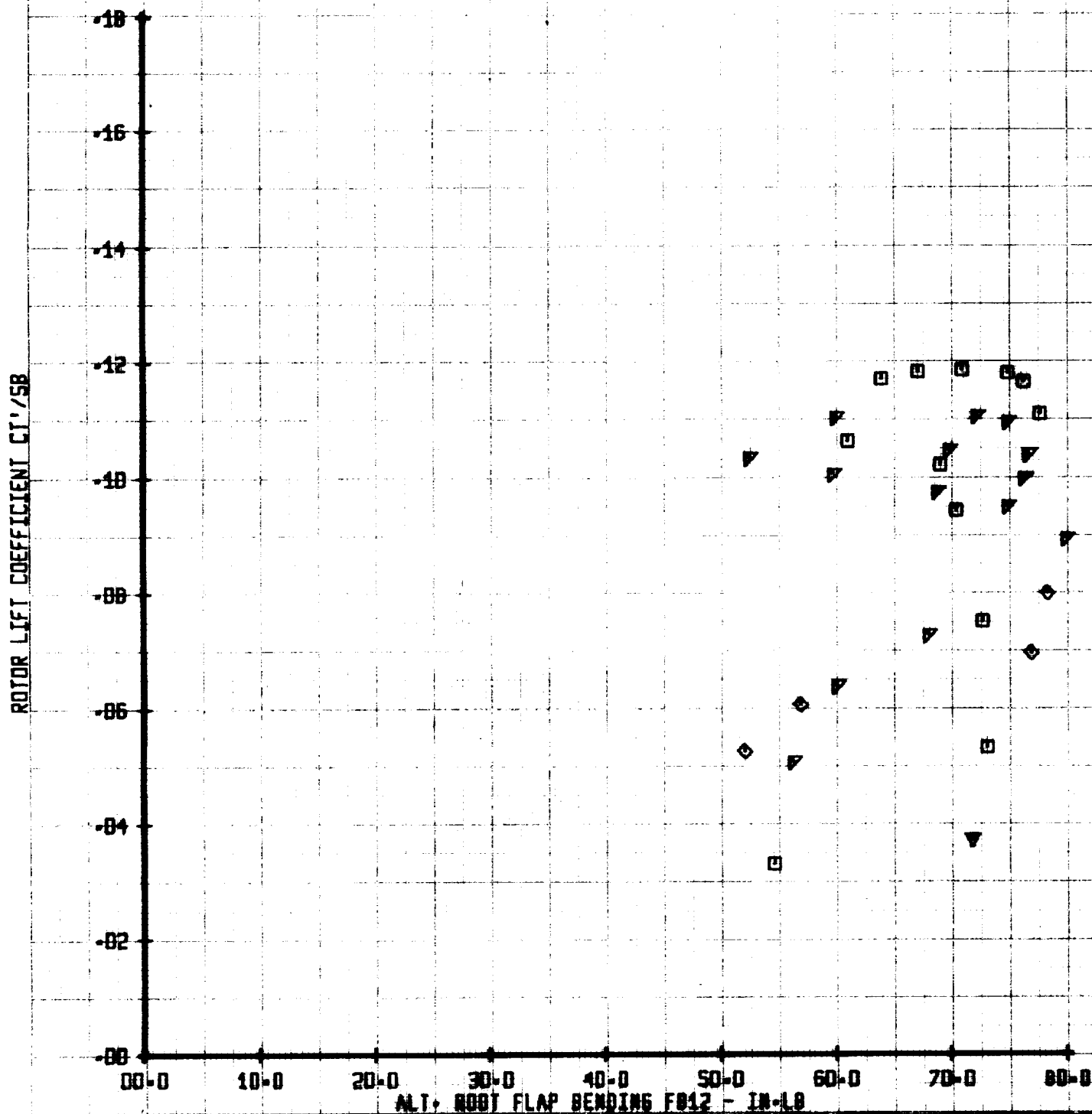


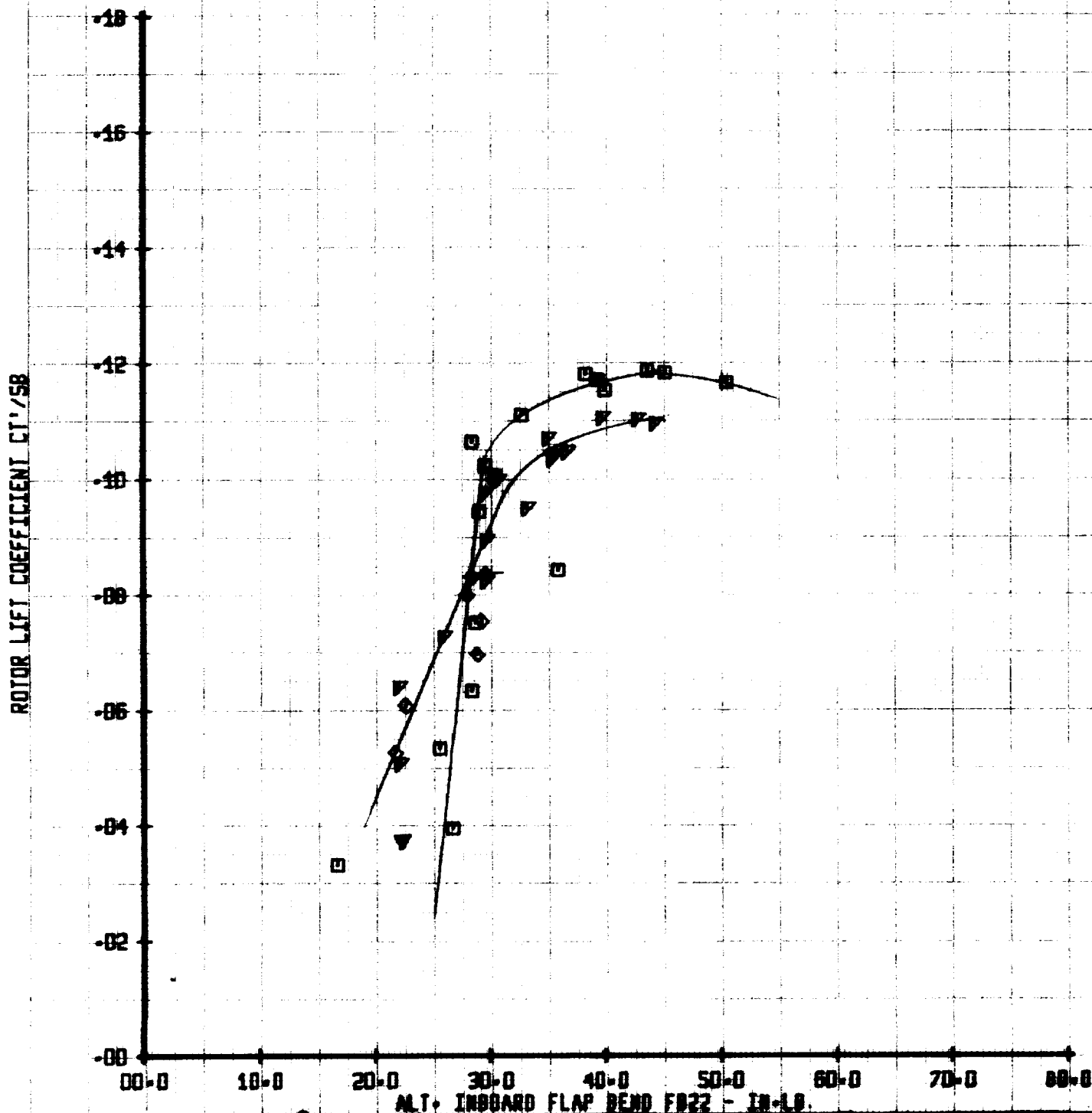
Figure A-150

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B MOTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	51	.55	.00258	329
▲	52	.55	.00258	329
◆	53	.55	.00258	329
▼	53	.55	.00258	329

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING INBOARD FLAP BENDING FB22

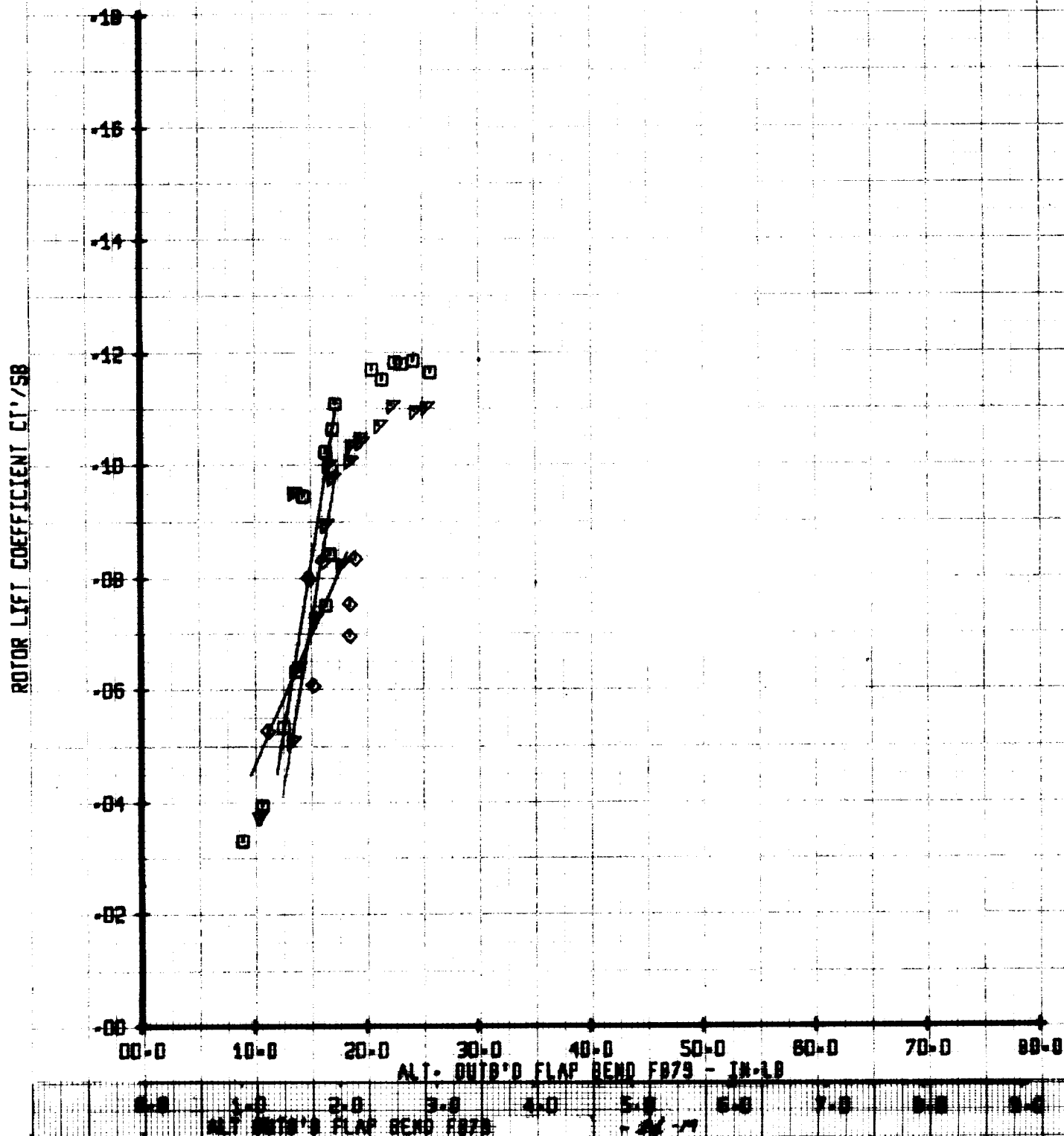


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	51	.53	.025	329
▽	50	.53	.05	329
◇	52	.53	.10	329
△	53	.53	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD FLAP BENDING FB79



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	VTUN
□	51	.59	.025	329
△	52	.59	.05	329
◇	53	.59	.10	329
▽	53	.59	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

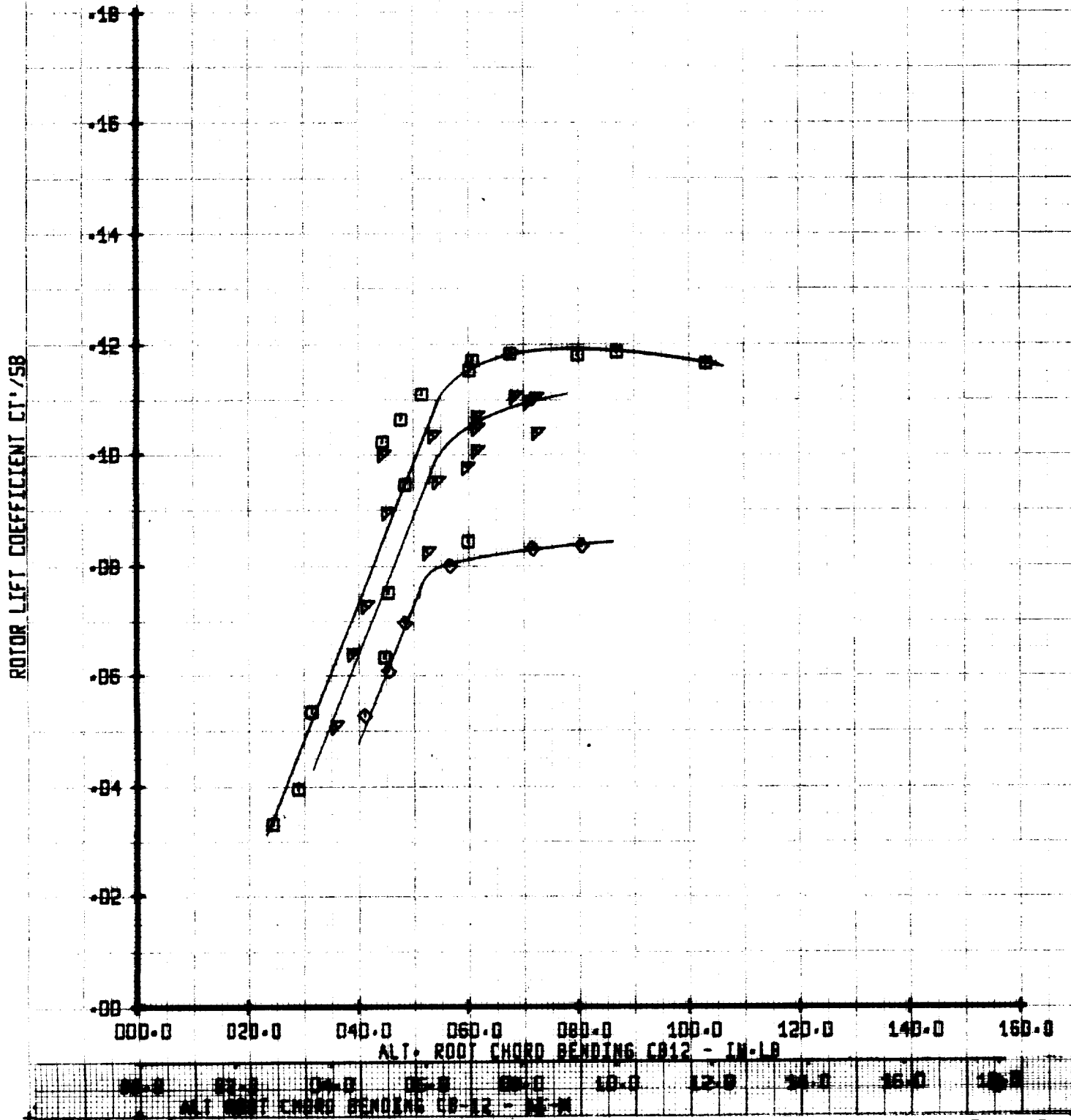
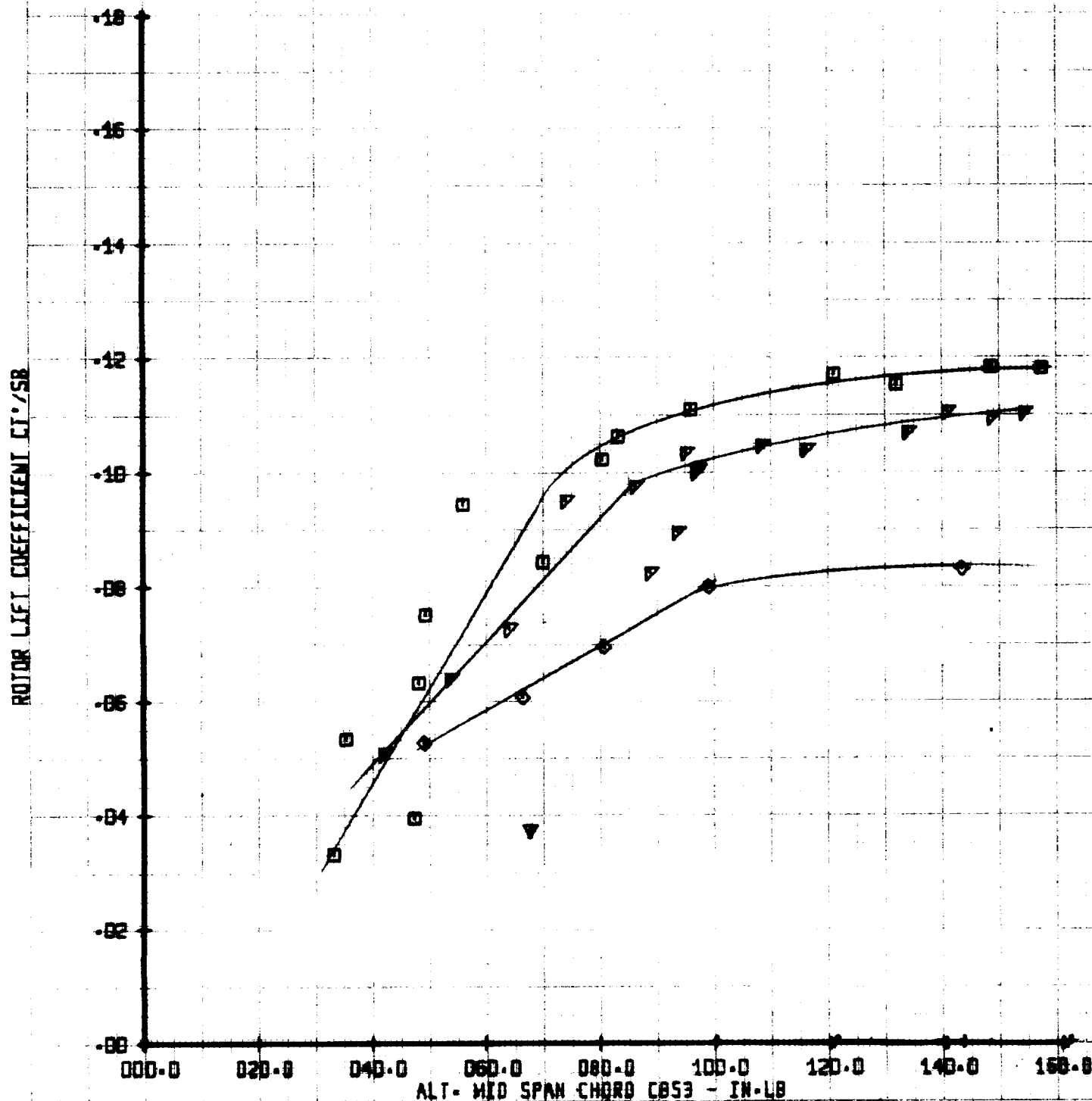


Figure A-153

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	VTUN
□	S1	.58	.025	329
▴	S0	.58	.05	329
◇	S2	.58	.10	329
▾	S3	.58	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN CHORD CB53



LEFT-PROPULSIVE FORCE LIMIT TEST

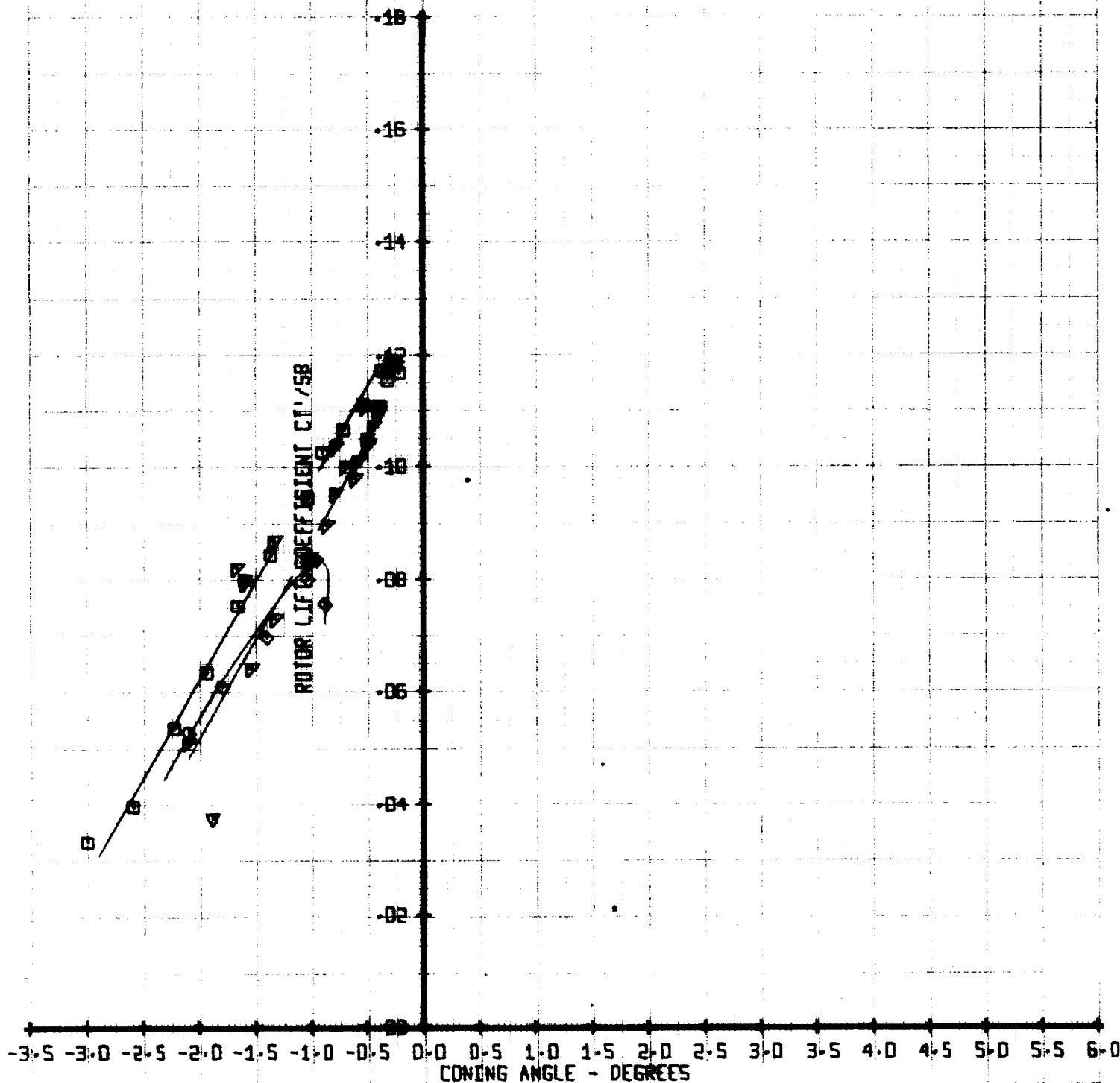
1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	51	.58	.025	329
○	50	.58	.05	329
△	52	.58	.10	329
▽	53	.58	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
CONING ANGLE

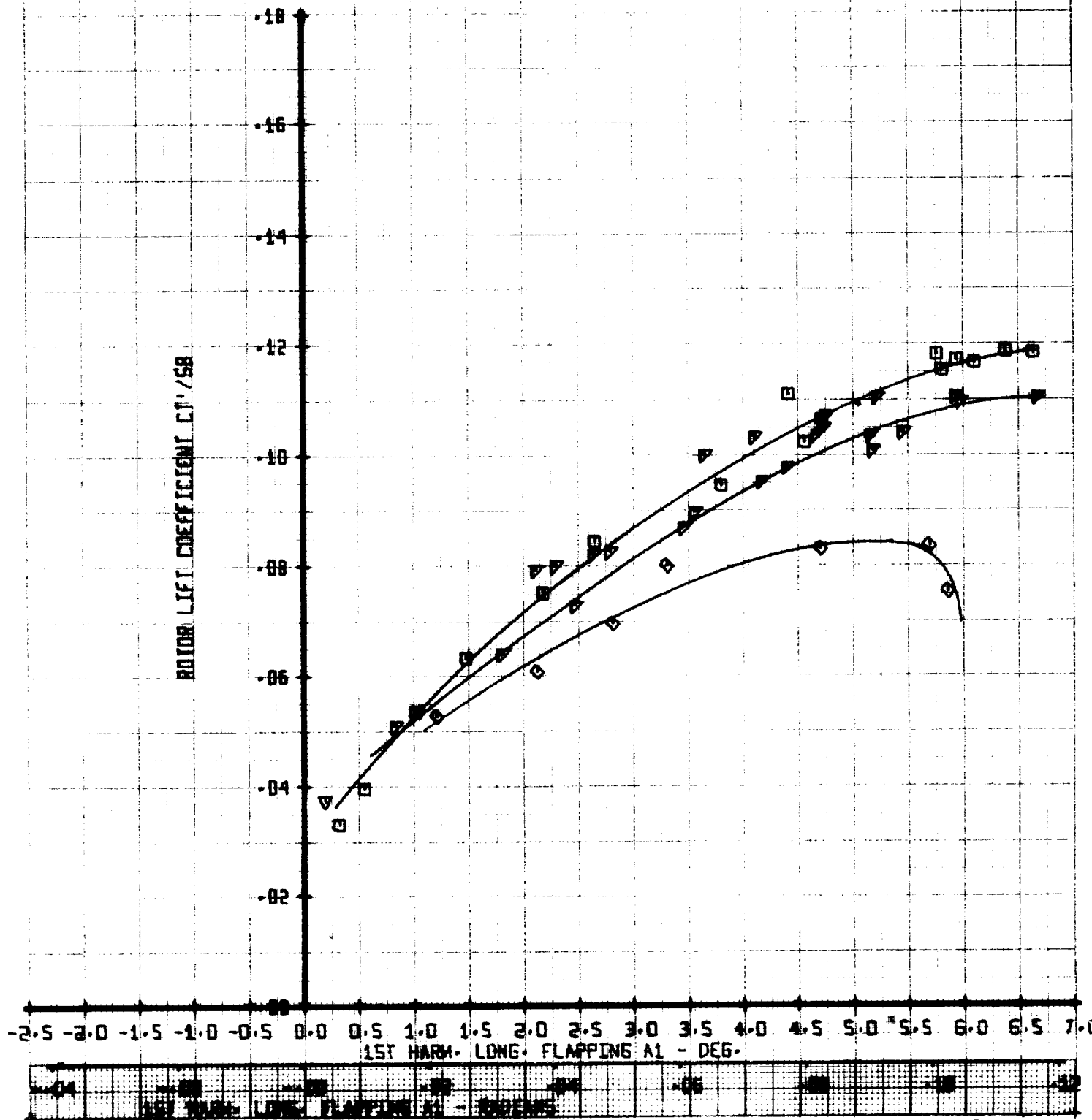


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-42B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/DD258	YTUN
□	51	.58	.025	329
△	50	.58	.05	329
◇	52	.58	.10	329
▽	53	.58	.20	329

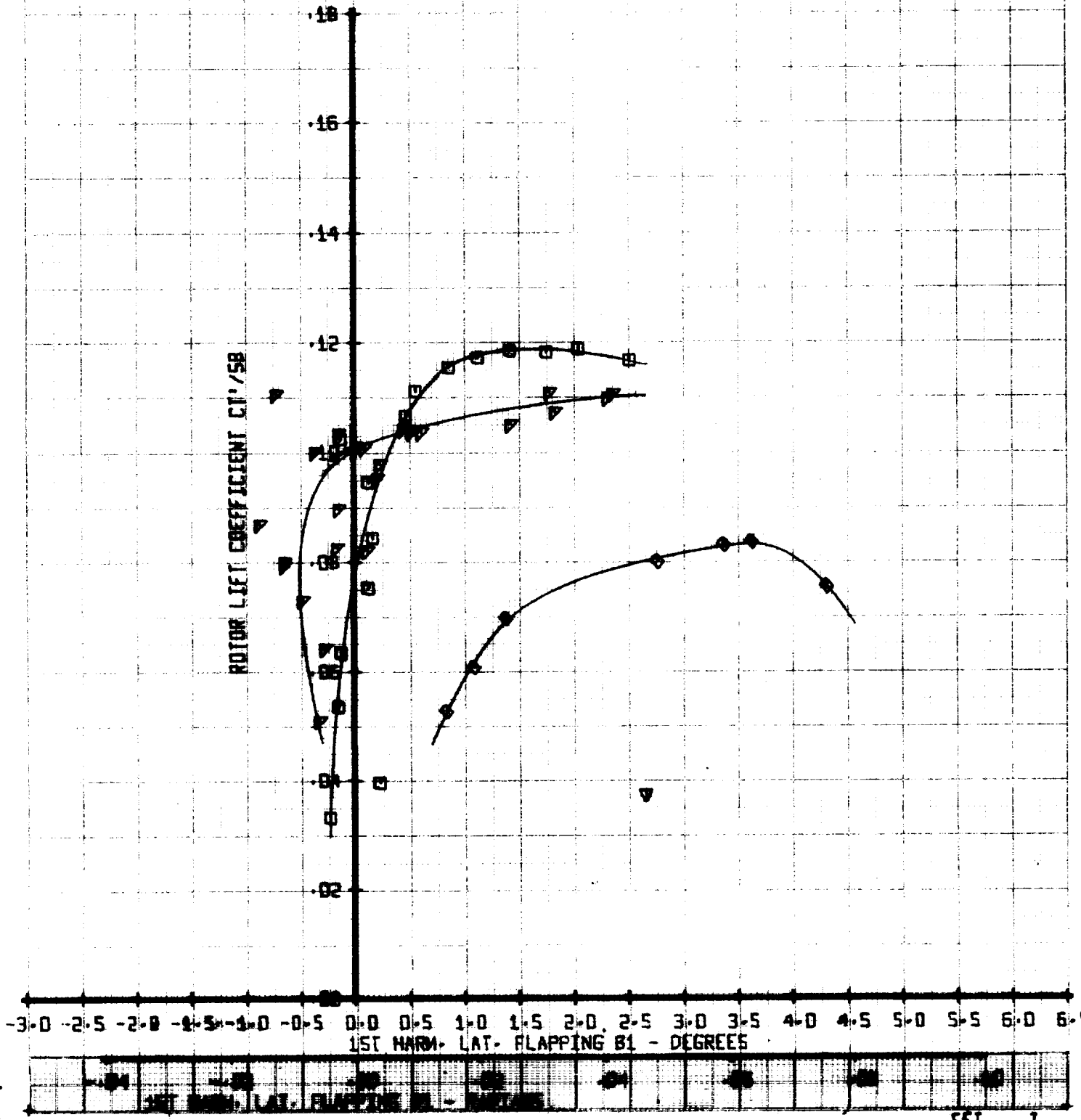
ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-470 ROTOR
 LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	Y/TUM
□	51	.58	.025	329
△	50	.58	.05	329
▽	52	.58	.10	329
◇	53	.58	.20	329

ROTOR LIFT COEFFICIENT
 VERSUS
 1ST HARMONIC LATERAL FLAPPING B1

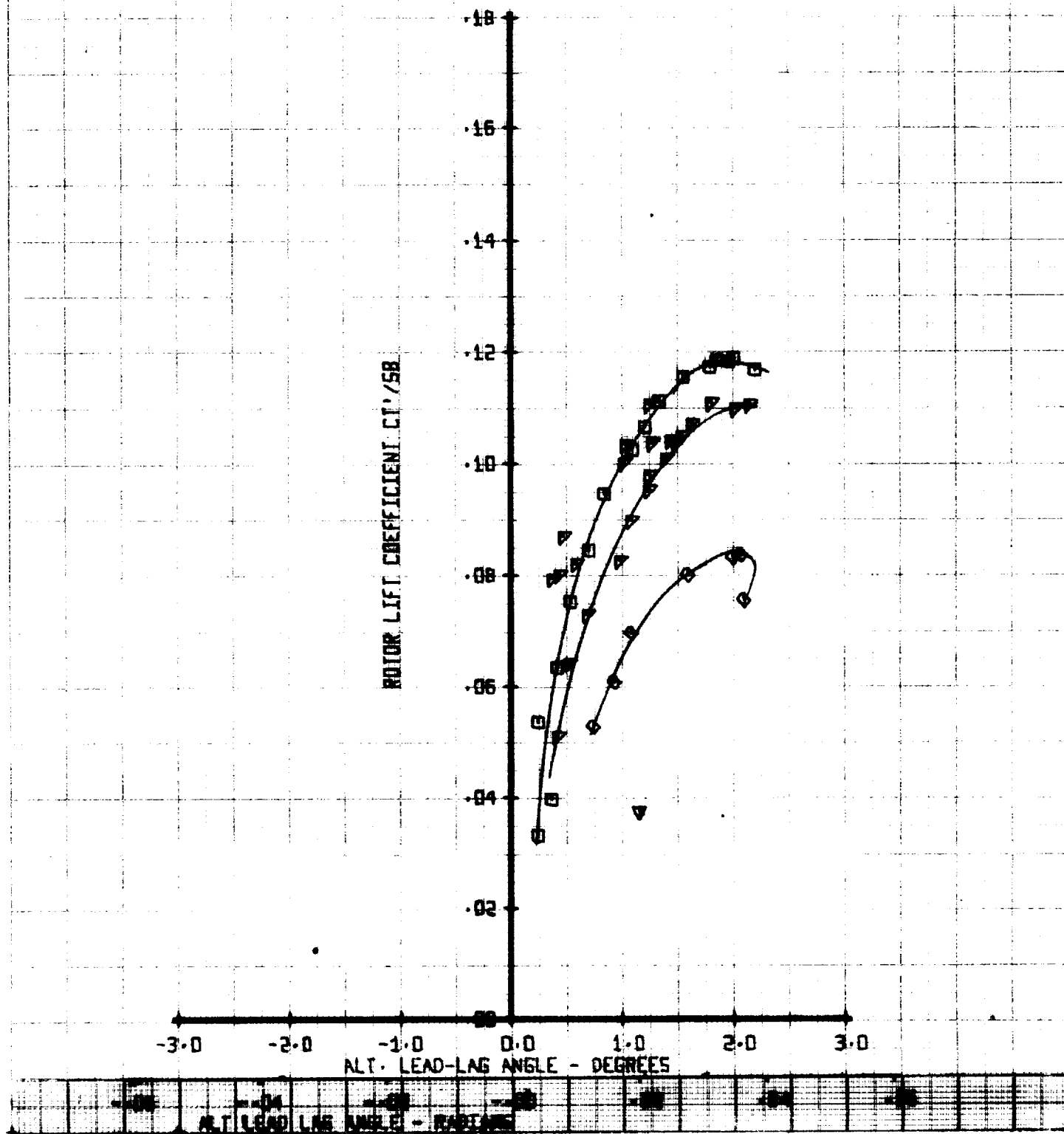


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	Y/TIN
□	51	.58	.025	329
△	50	.58	.05	329
◇	52	.58	.10	329
▽	53	.58	.20	329

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE

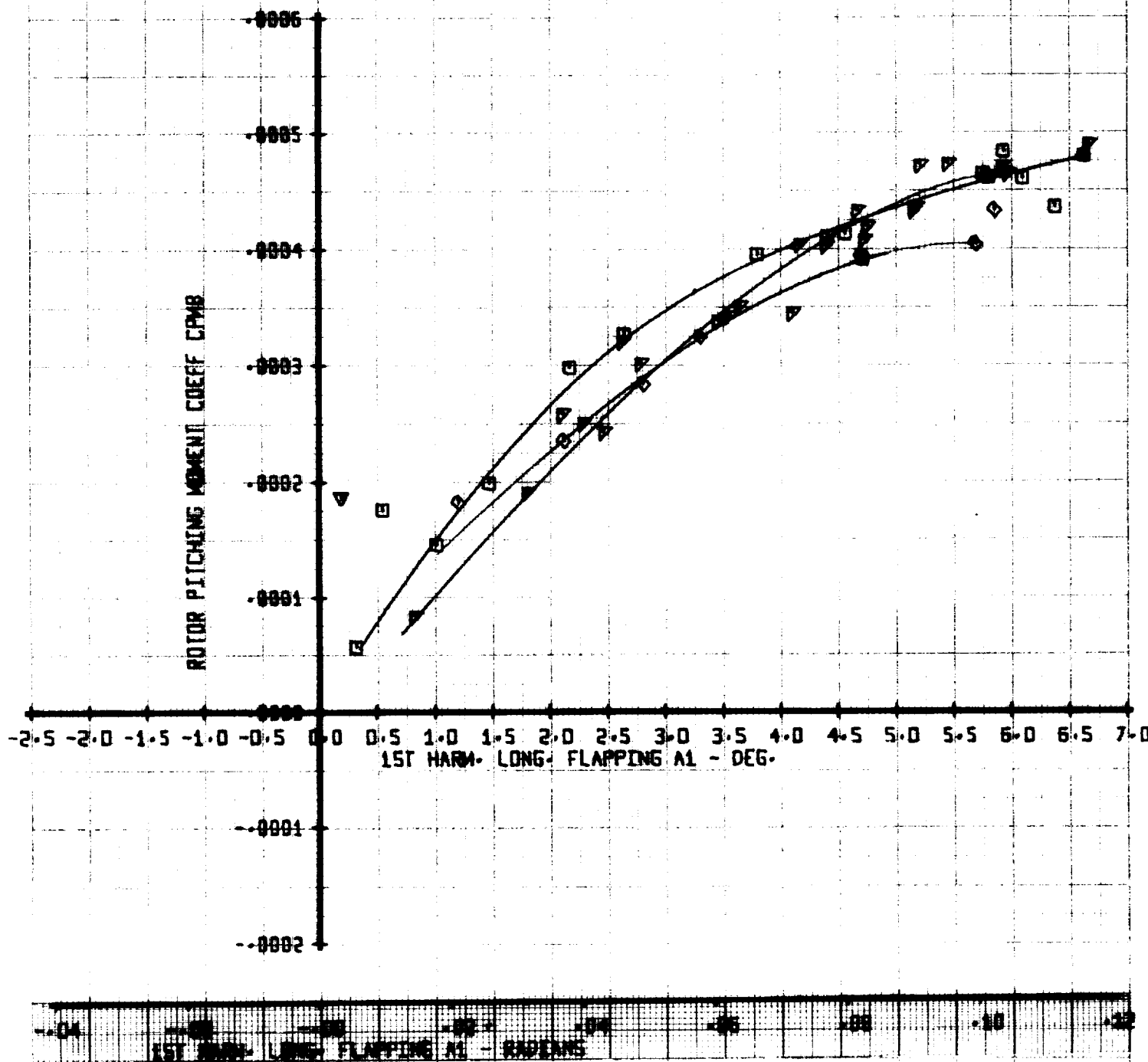


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/DD258	VTUN
□	51	.58	.025	329
△	50	.58	.05	329
◇	52	.58	.10	329
▽	53	.58	.20	329

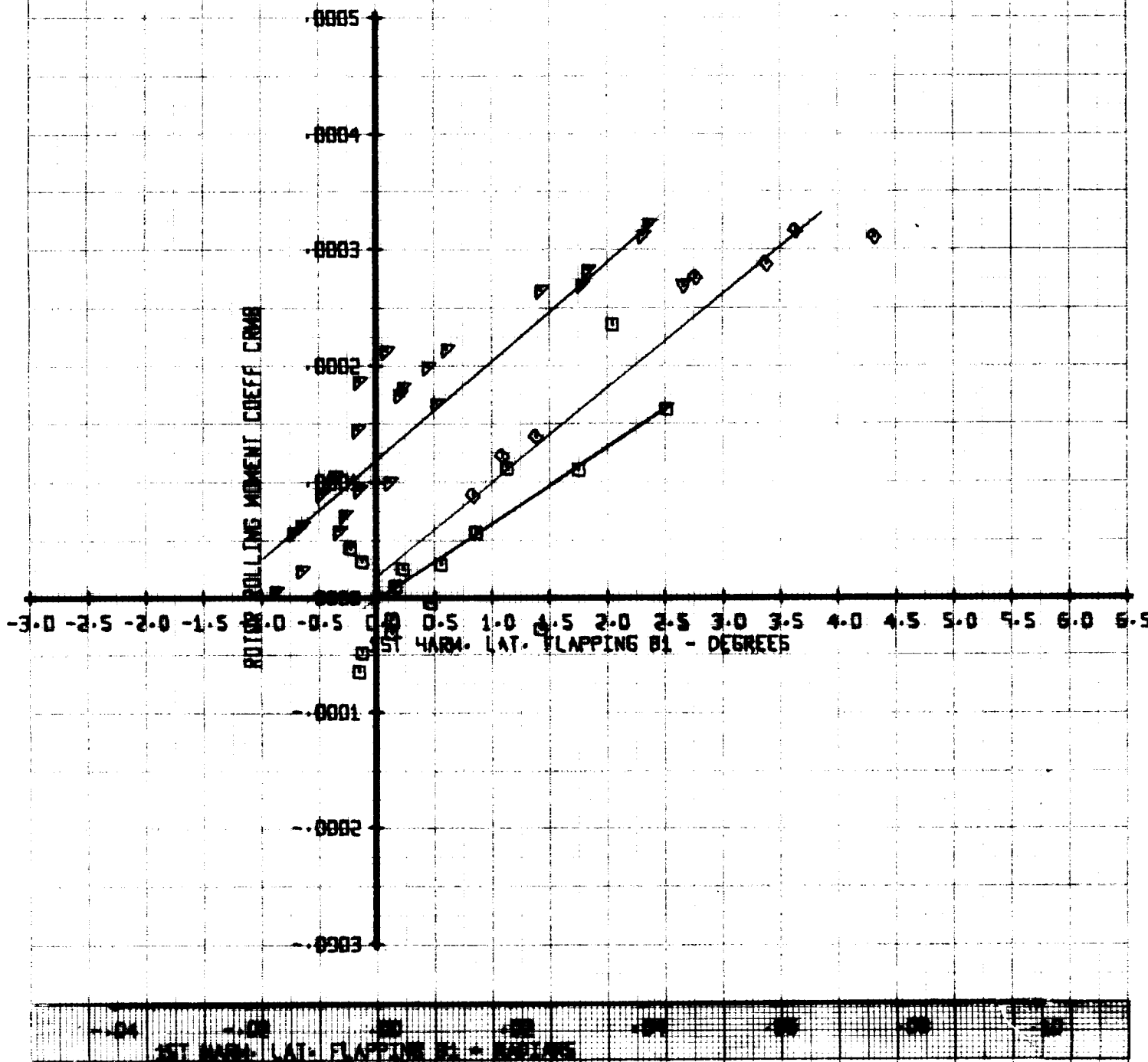
ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-470 ROTOR
 LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	Y/TUN
□	51	.58	.025	329
△	50	.58	.05	329
◇	52	.58	.10	329
▽	53	.58	.20	329

ROTOR ROLLING MOMENT COEFFICIENT
 VERSUS
 1ST HARMONIC LATERAL FLAPPING B1



LIFT-PROPULSIVE FORCE LIMIT TEST

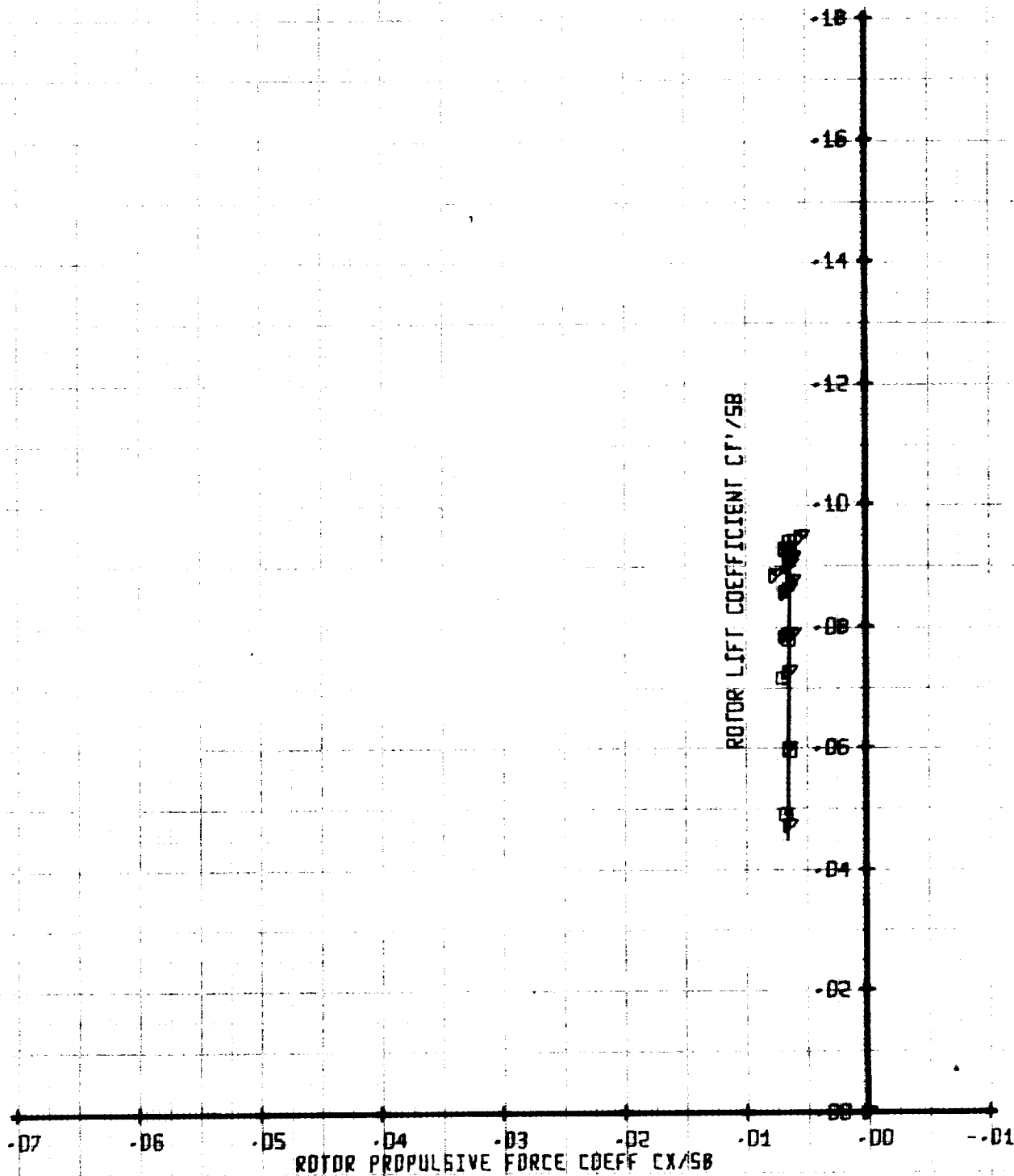
1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/DD2SB	VTUN
□	227	.45	.05	279
□	36	.45	.05	279

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PROPULSIVE FORCE COEFFICIENT

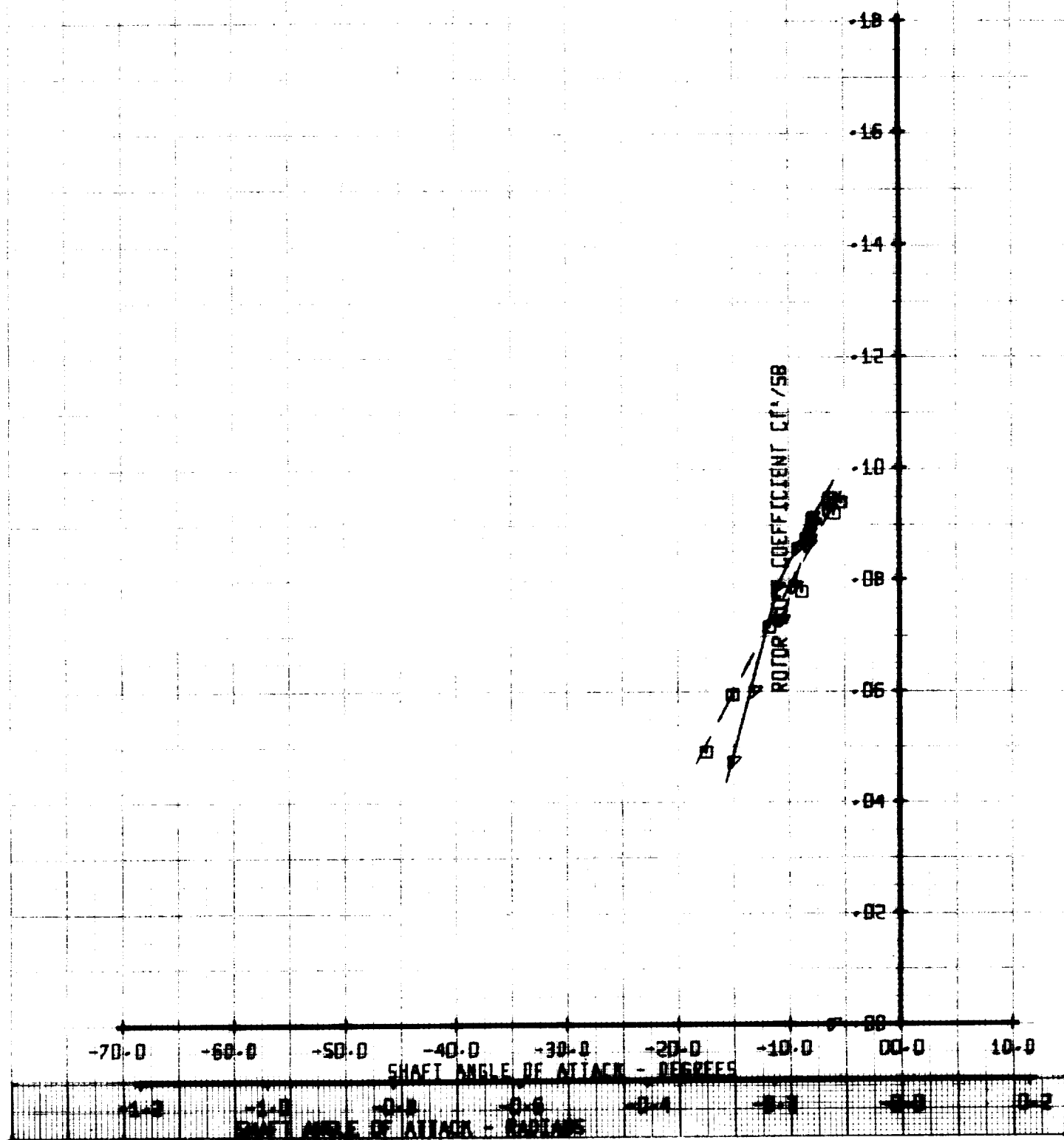


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	Y/TUN
□	227	.45	.05	279
▽	36	.45	.05	279

ROTOR LIFT COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK



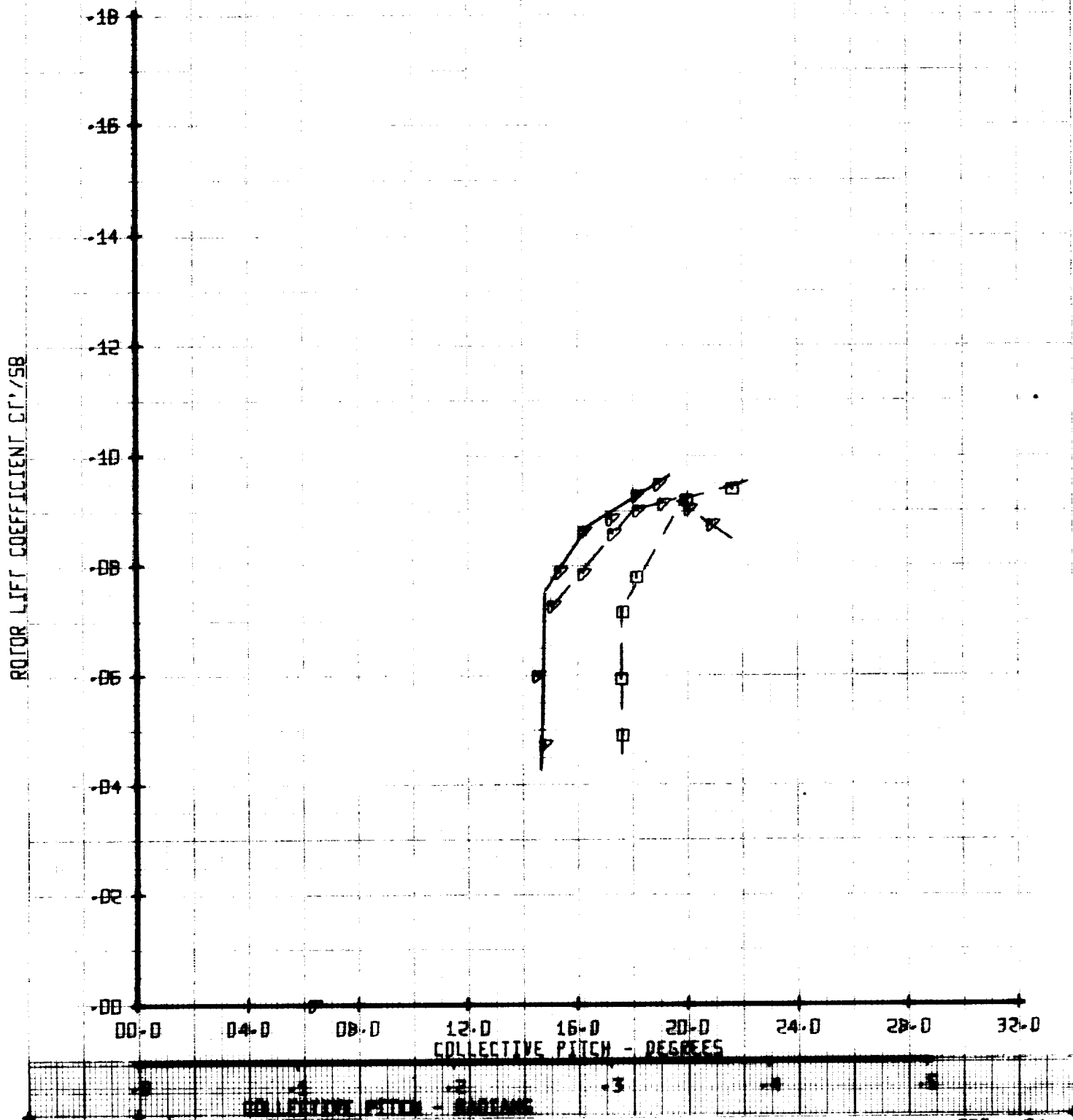
SET 34
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/DD2SB	VTUN
□	227	.45	.05	279
▽	36	.45	.05	279

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH

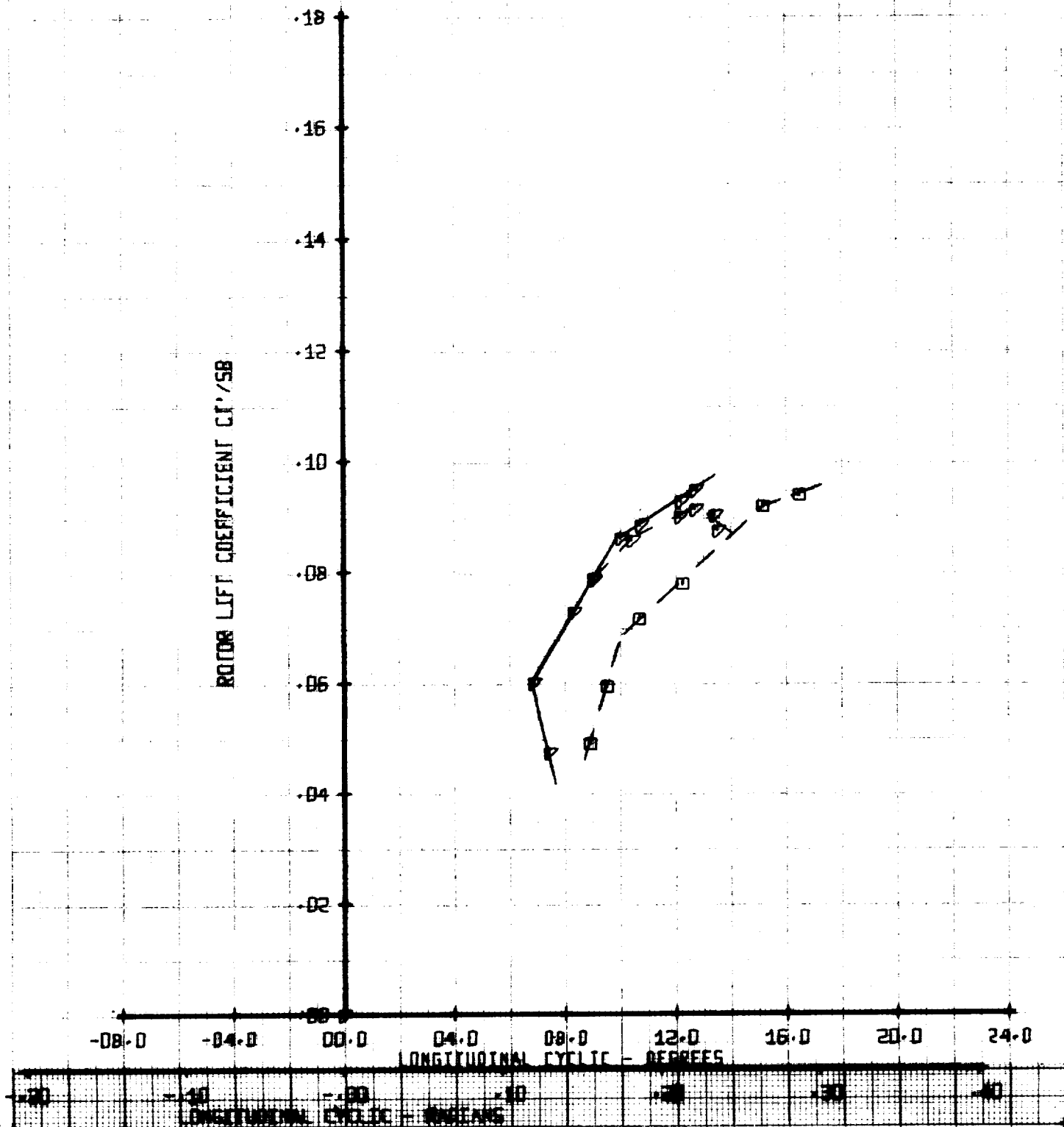


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/QD2SB	YTLN
□	227	.45	.05	279
▽	36	.45	.05	279

ROTOR LIFT COEFFICIENT
 VERSUS
 LONGITUDINAL CYCLIC



SET 34
 BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM
□
▽

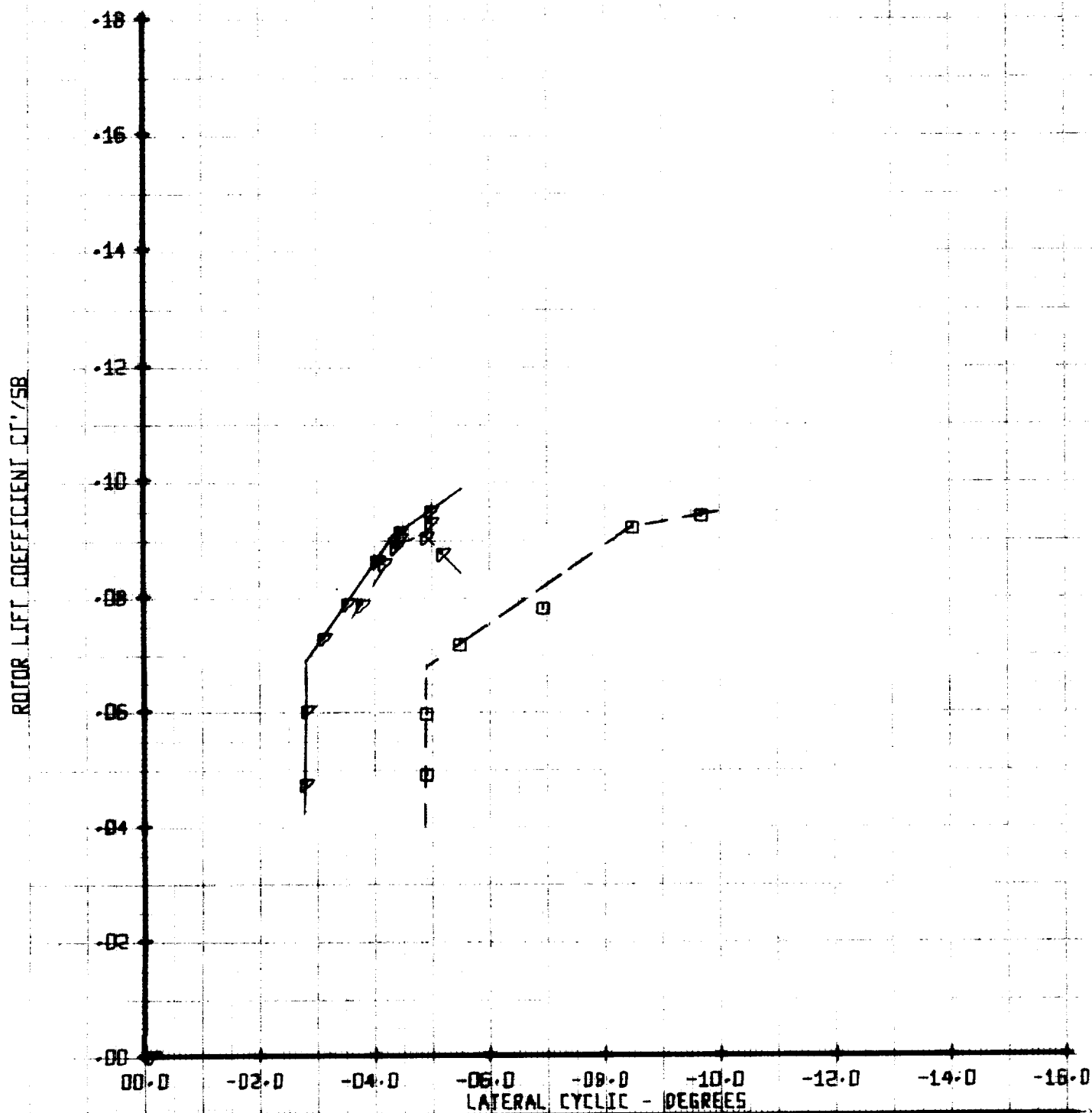
RUN
227
36

ML'
.45
.45

X/DD258
.05
.05

VTUN
279
279

ROTOR LIFT COEFFICIENT
VERSUS
LATERAL CYCLIC

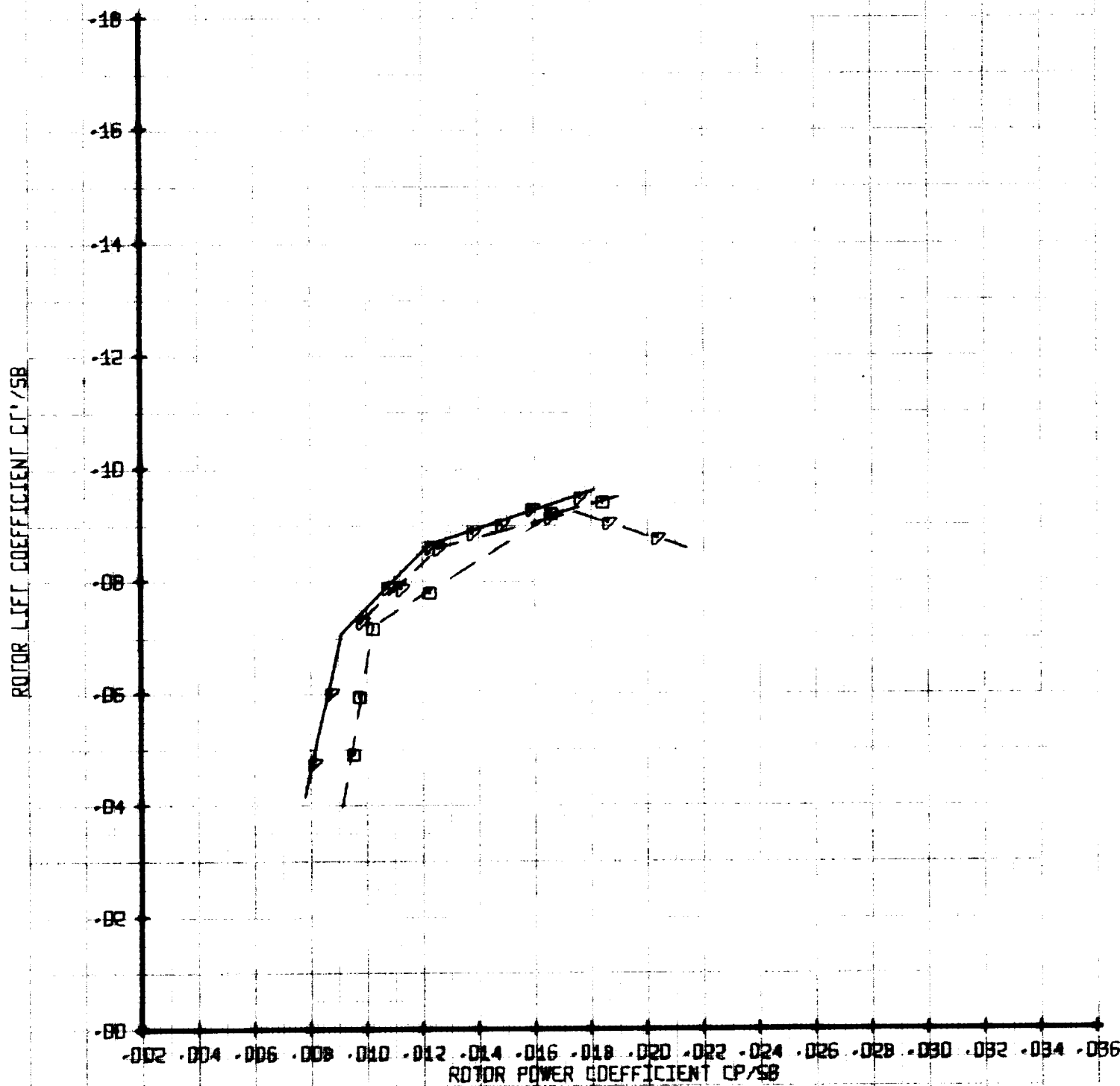


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/002SB	VTUN
□	227	.45	.05	279
▽	36	.45	.05	279

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT



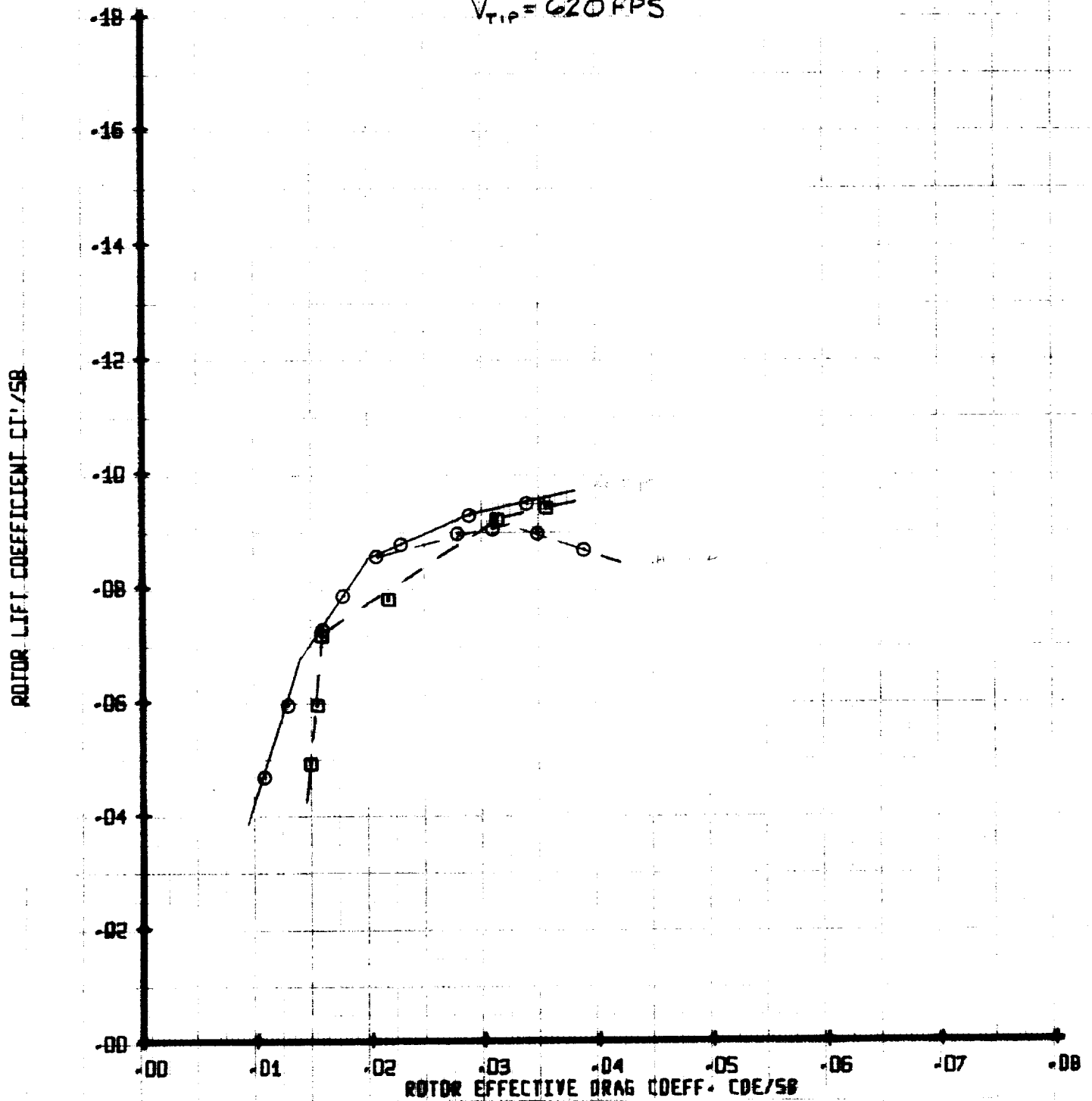
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	227	.45	.05	279
○	36	.45	.05	279

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT

$V_{TIP} = 620 \text{ FPS}$

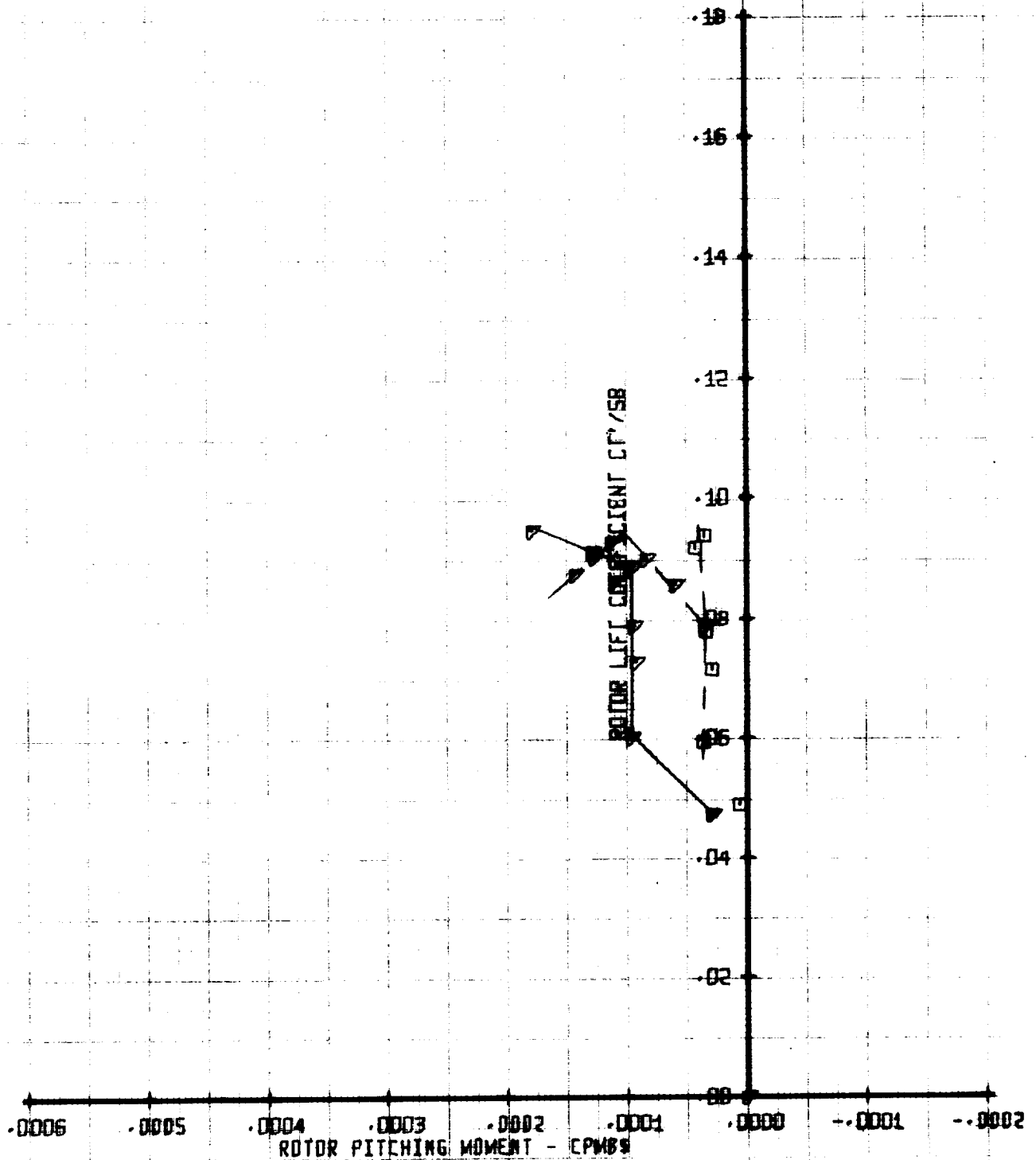


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/OD258	YTUN
□	227	.45	.05	279
▽	36	.45	.05	279

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

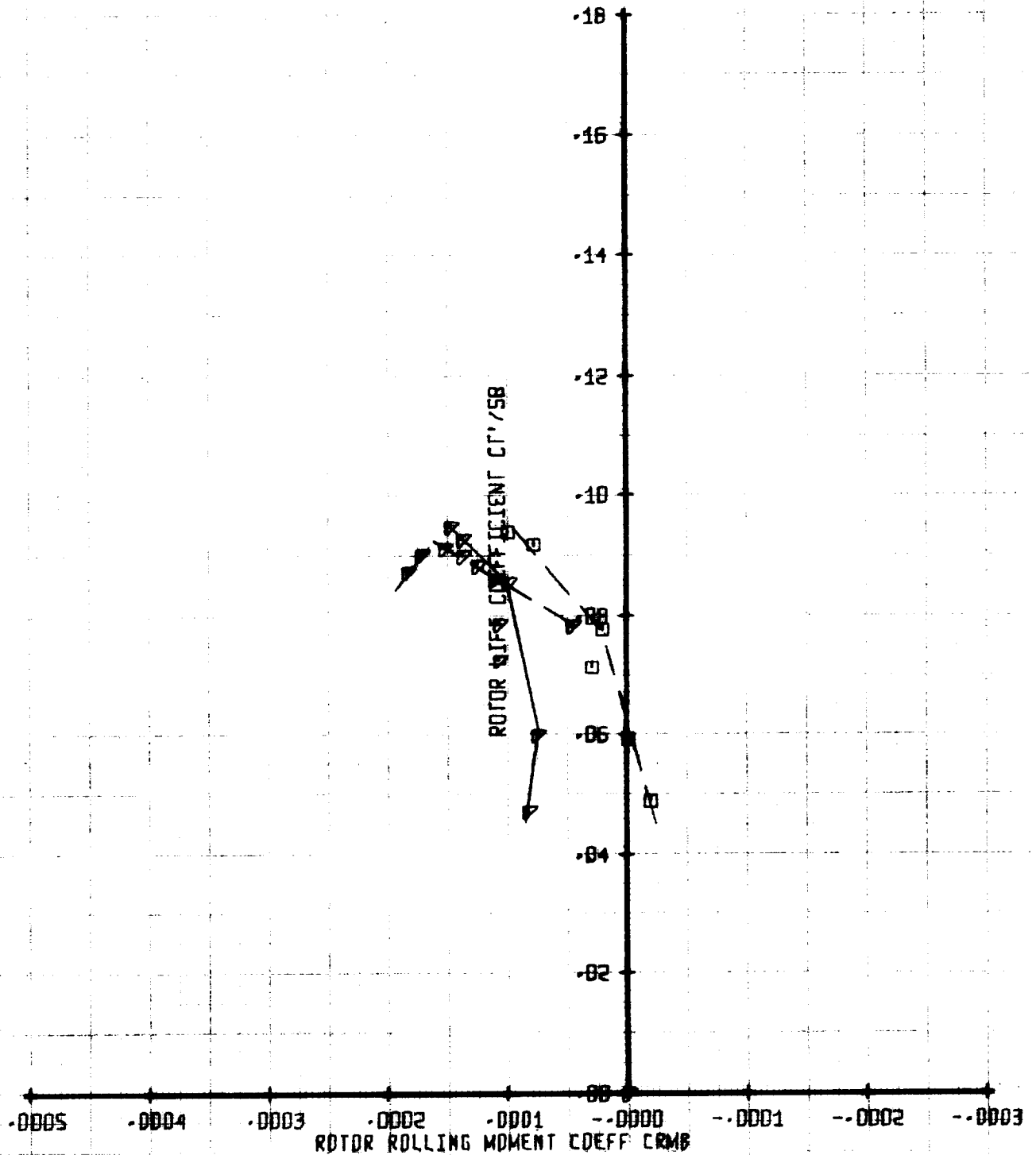


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	227	.45	.05	279
△	36	.45	.05	279

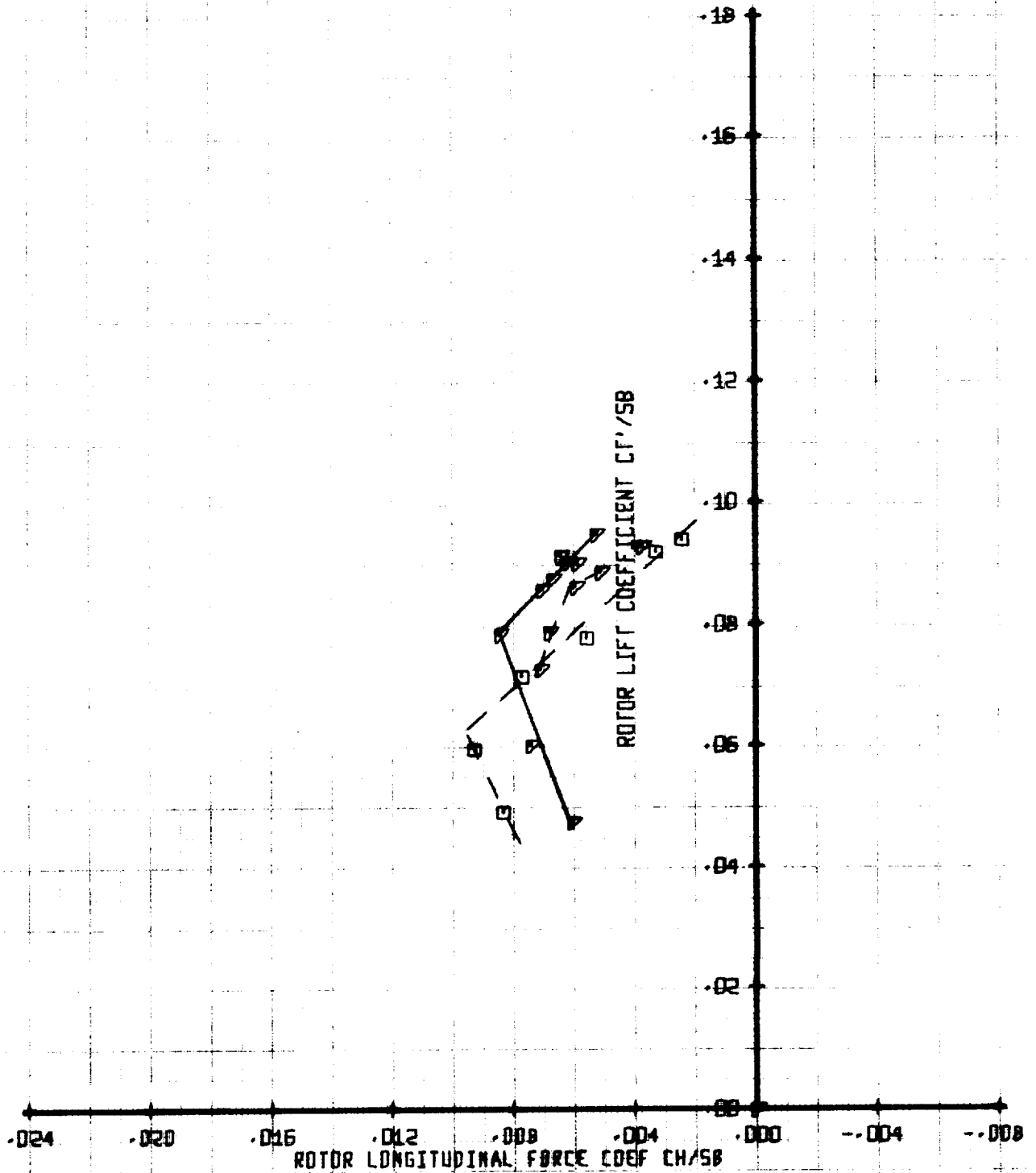
ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND		MU'	X/QD2SB	VTUN
SYM	RUN	.45	.05	279
□	227	.45	.05	279
▽	36	.45	.05	279

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT

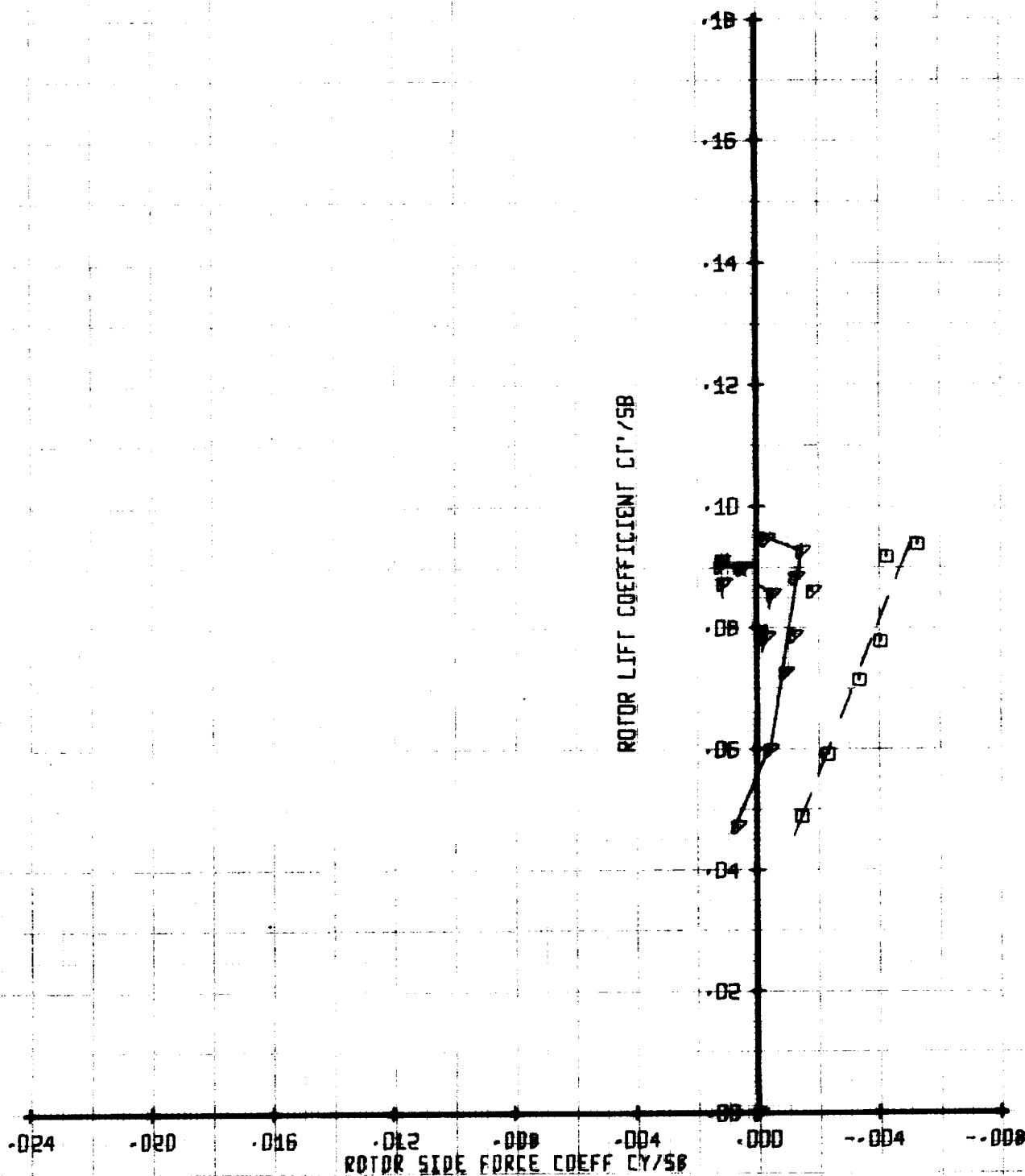


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTUN
□	227	.45	.05	279
○	36	.45	.05	279

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT

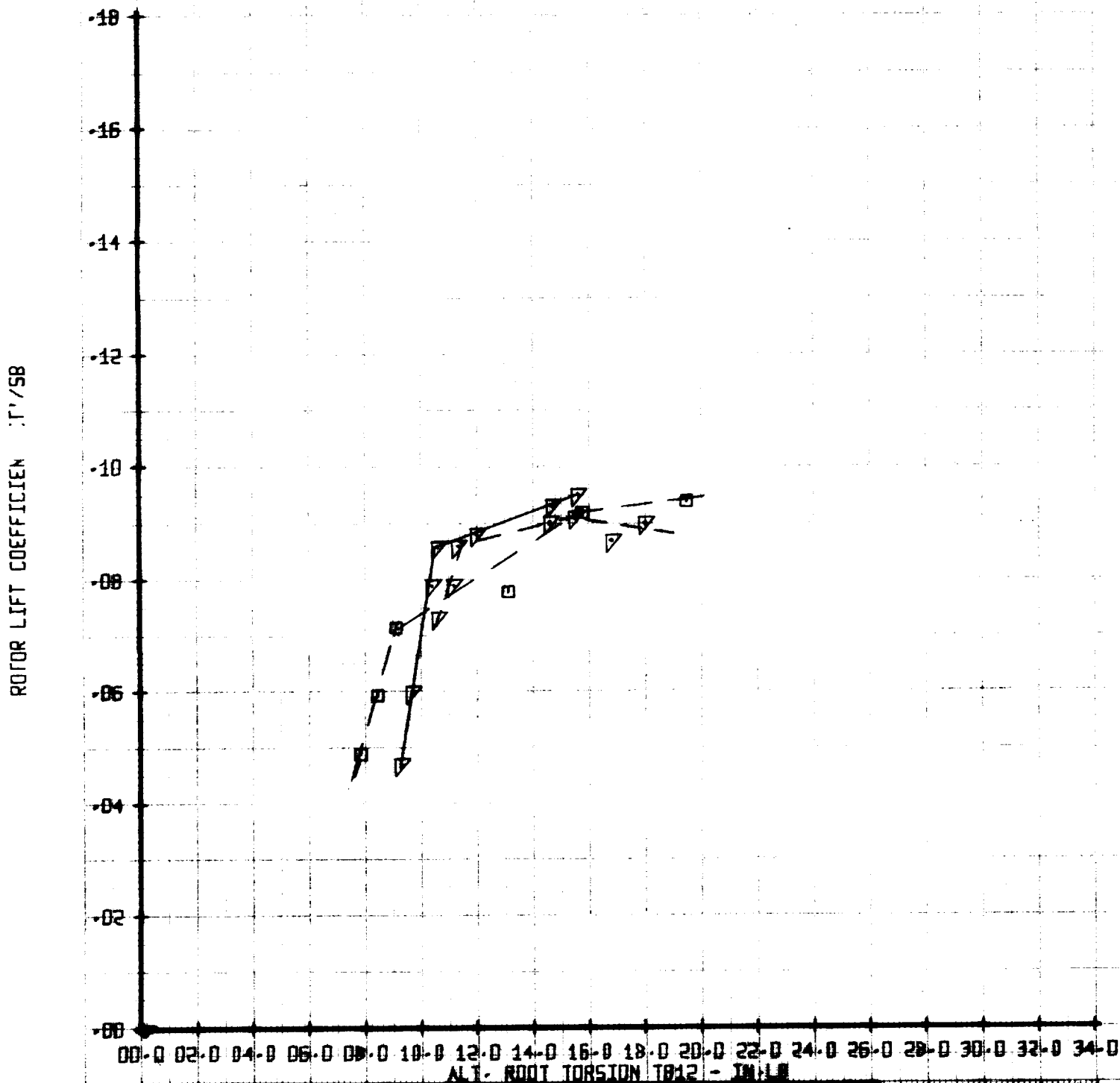


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	Y/LIN
□	227	.45	.05	279
▽	36	.45	.05	279

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

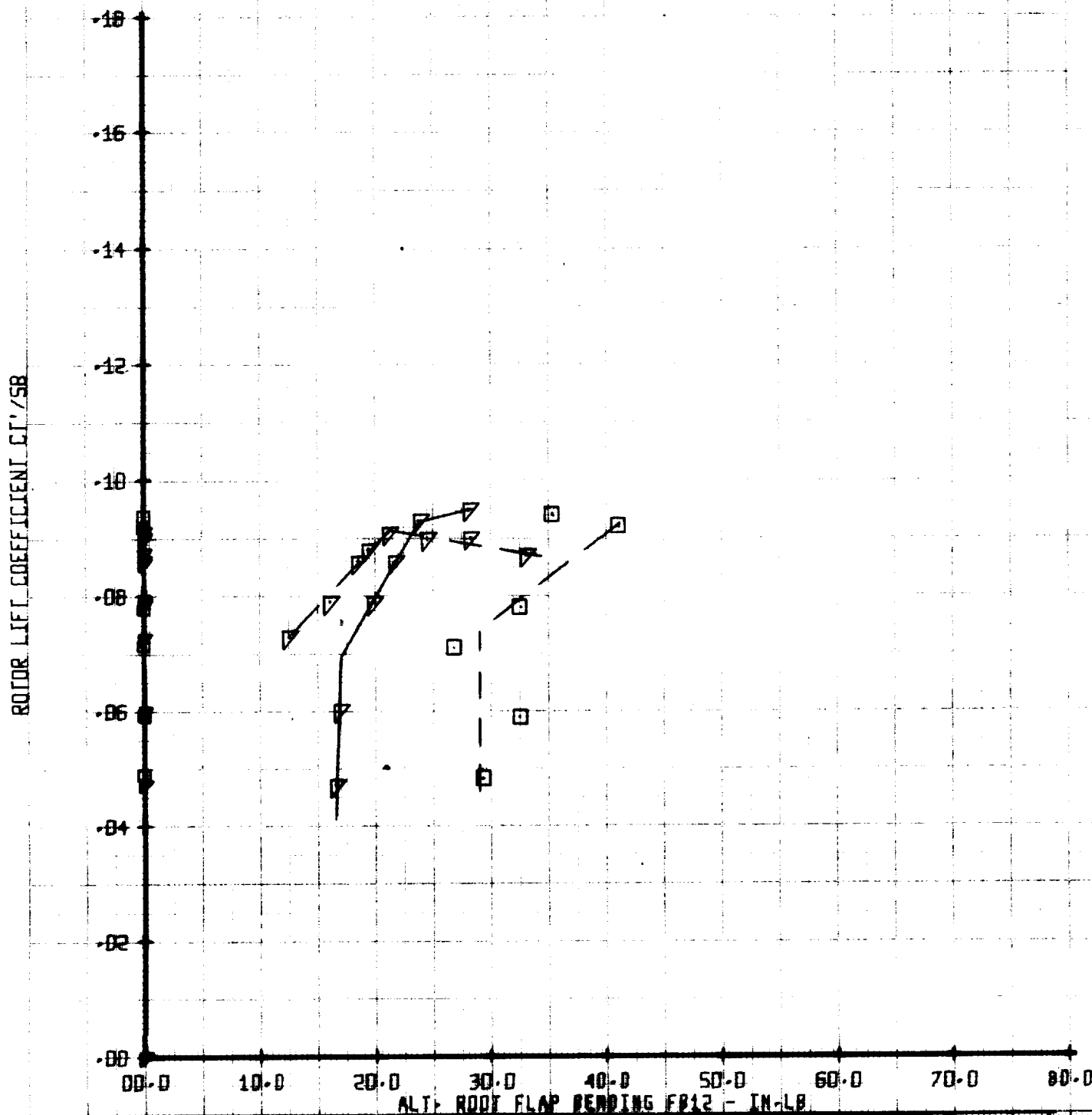


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/DO2SB	YDUN
□	227	.45	.05	279
▽	36	.45	.05	279

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

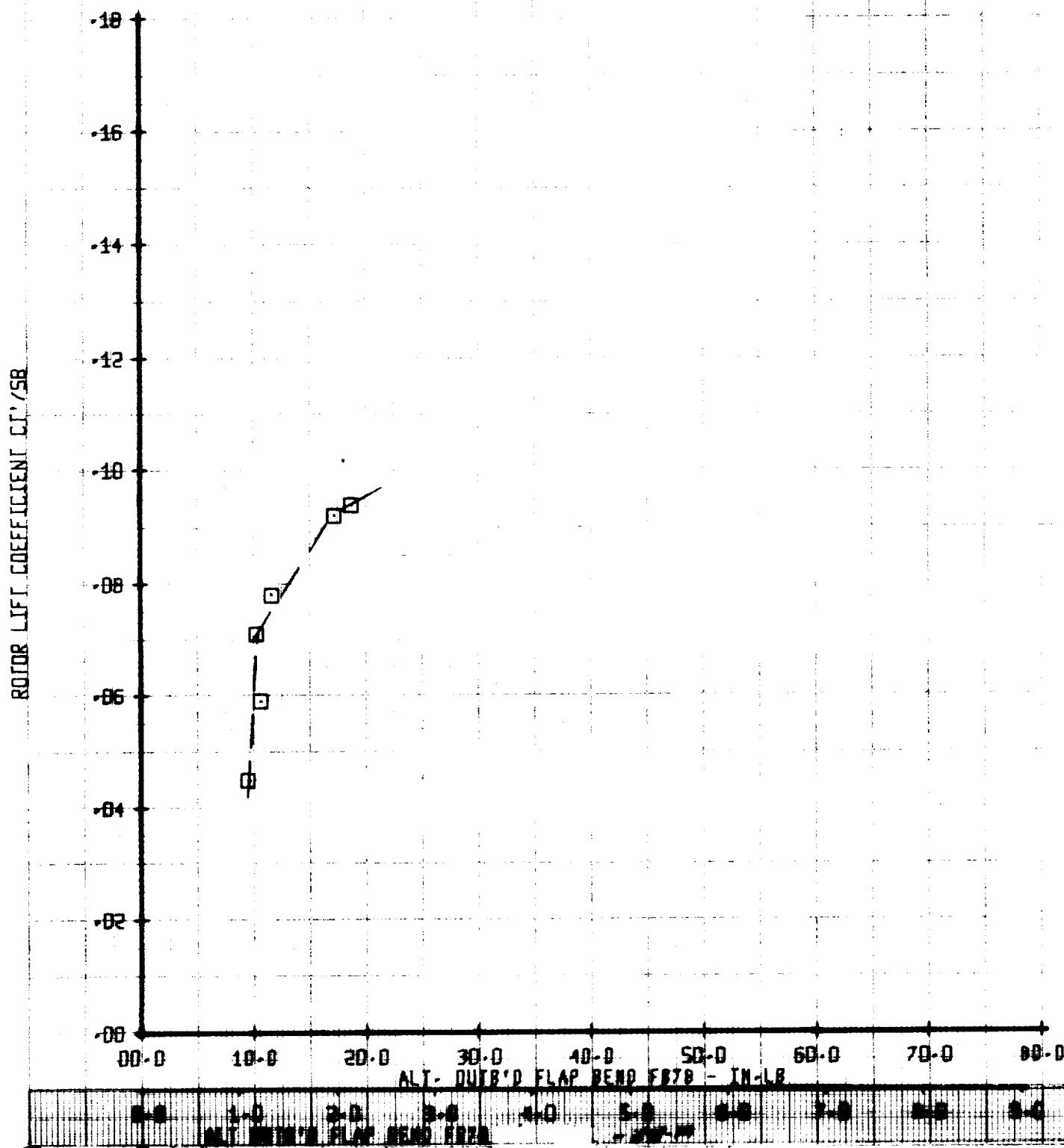


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/0025B	YTUN
0	227	.45	.05	279
7	36	.45	.05	279

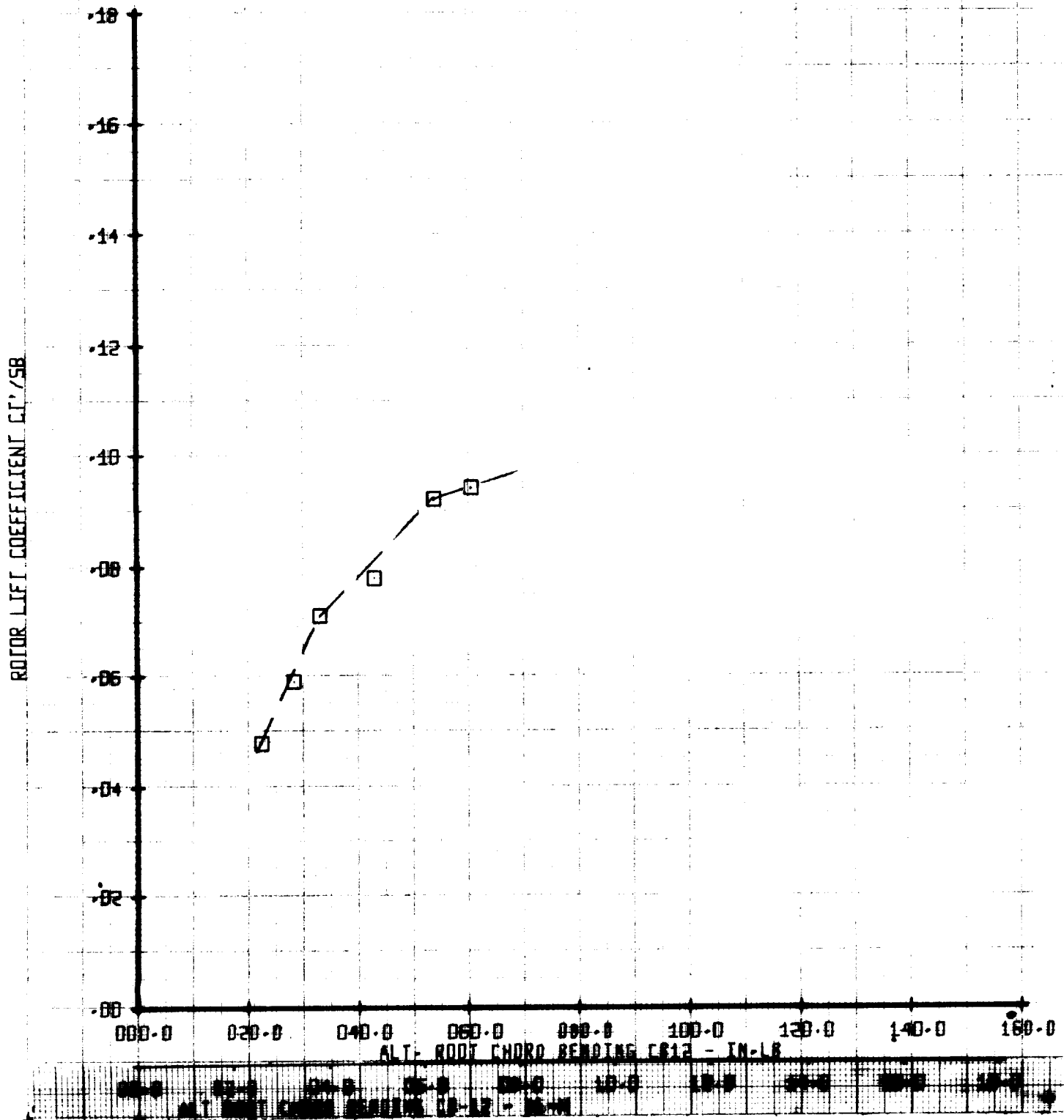
ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD FLAP BENDING FB78



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND				
SYM	RUN	MU'	X/OD2SB	VTUN
□	227	.45	.05	279
▽	36	.45	.05	279

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	225	.50	.05	310
▽	39	.50	.05	310

ROTOR LIFT COEFFICIENT
 VERSUS
 ROTOR PROPULSIVE FORCE COEFFICIENT

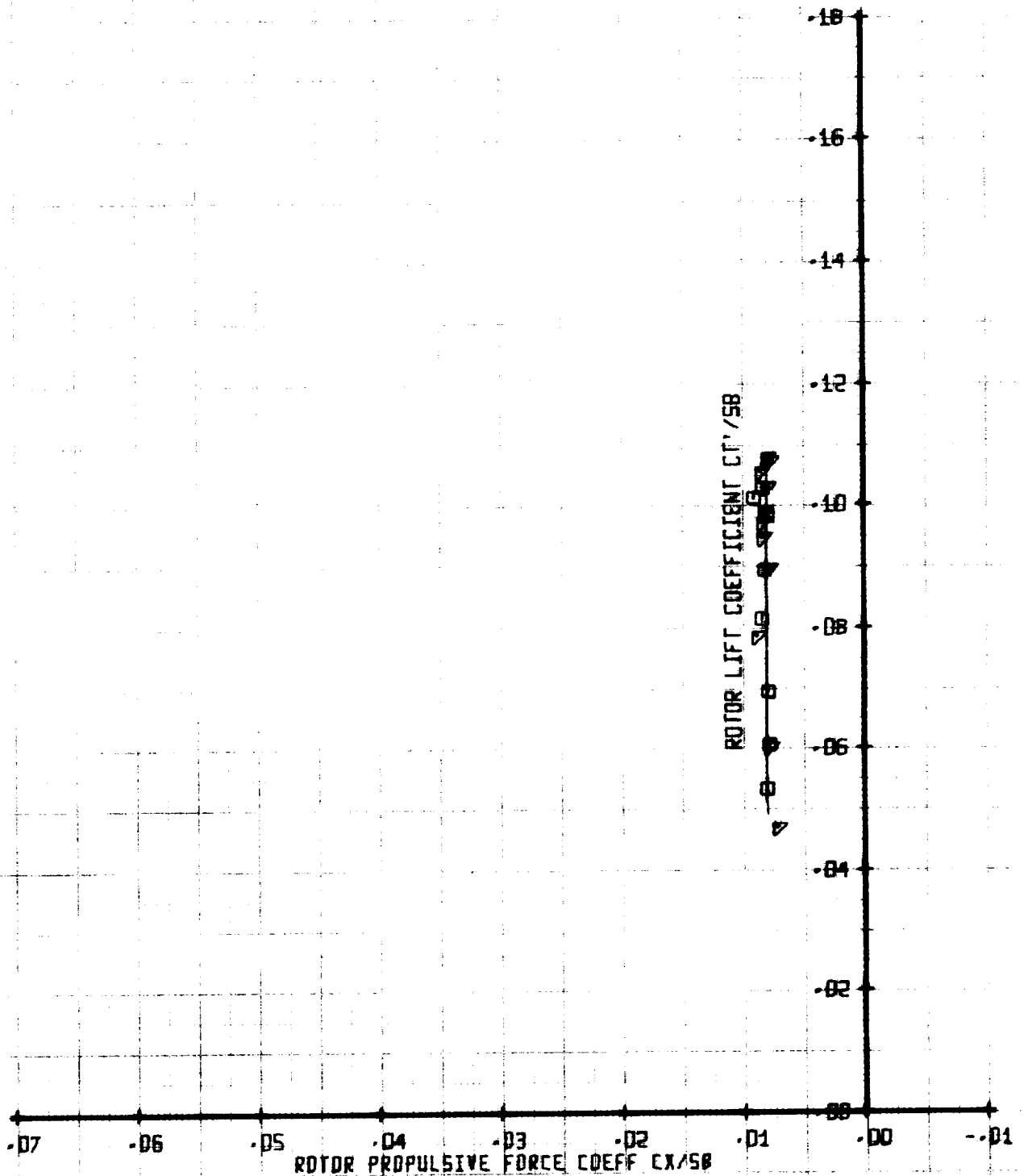


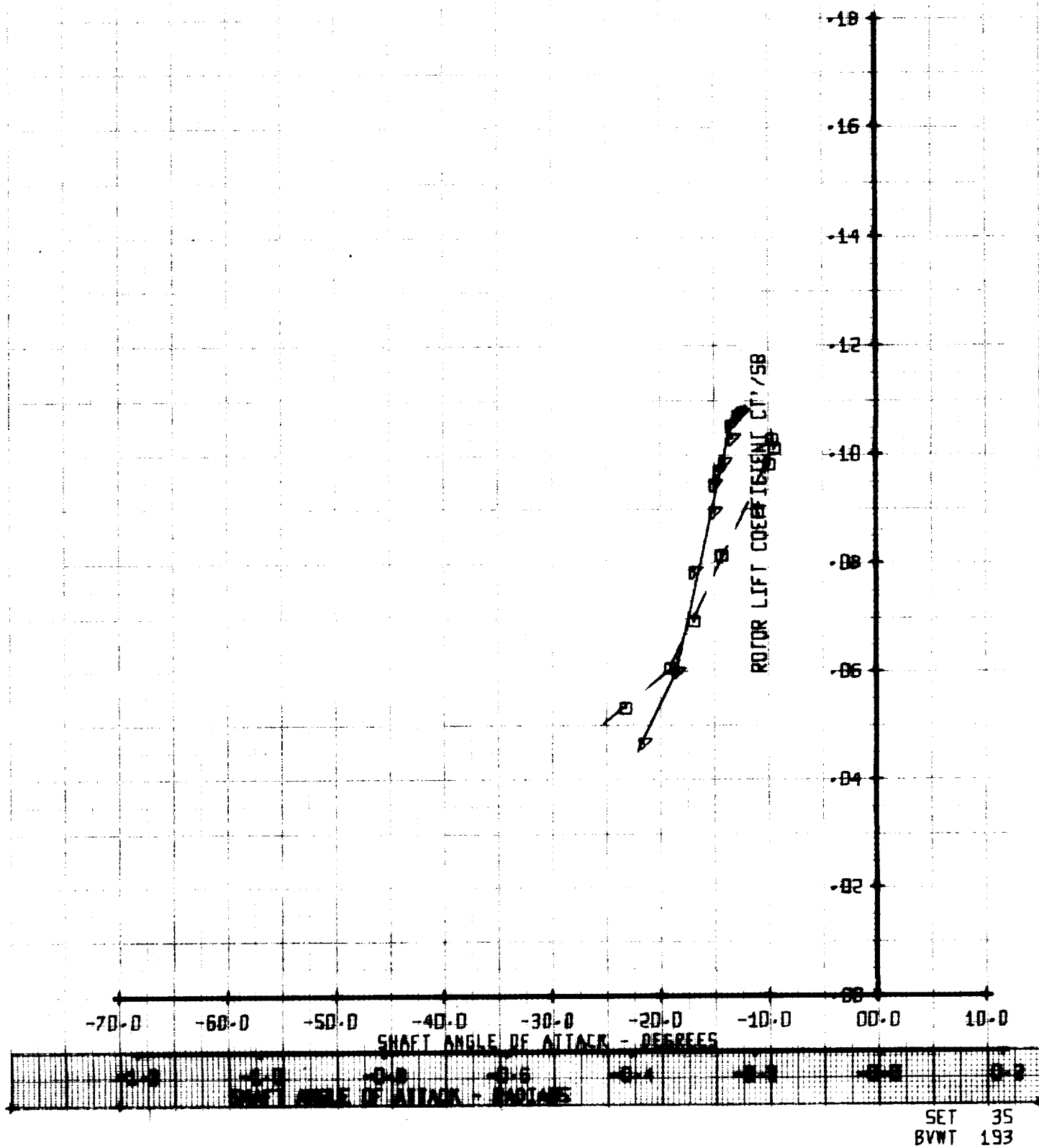
Figure A-174

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	1/00258	VTUN
□	225	.50	.05	310
◇	39	.50	.05	310

ROTOR LIFT COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/QD2SB	YTLN
□	225	.50	.05	310
△	39	.50	.05	310

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH

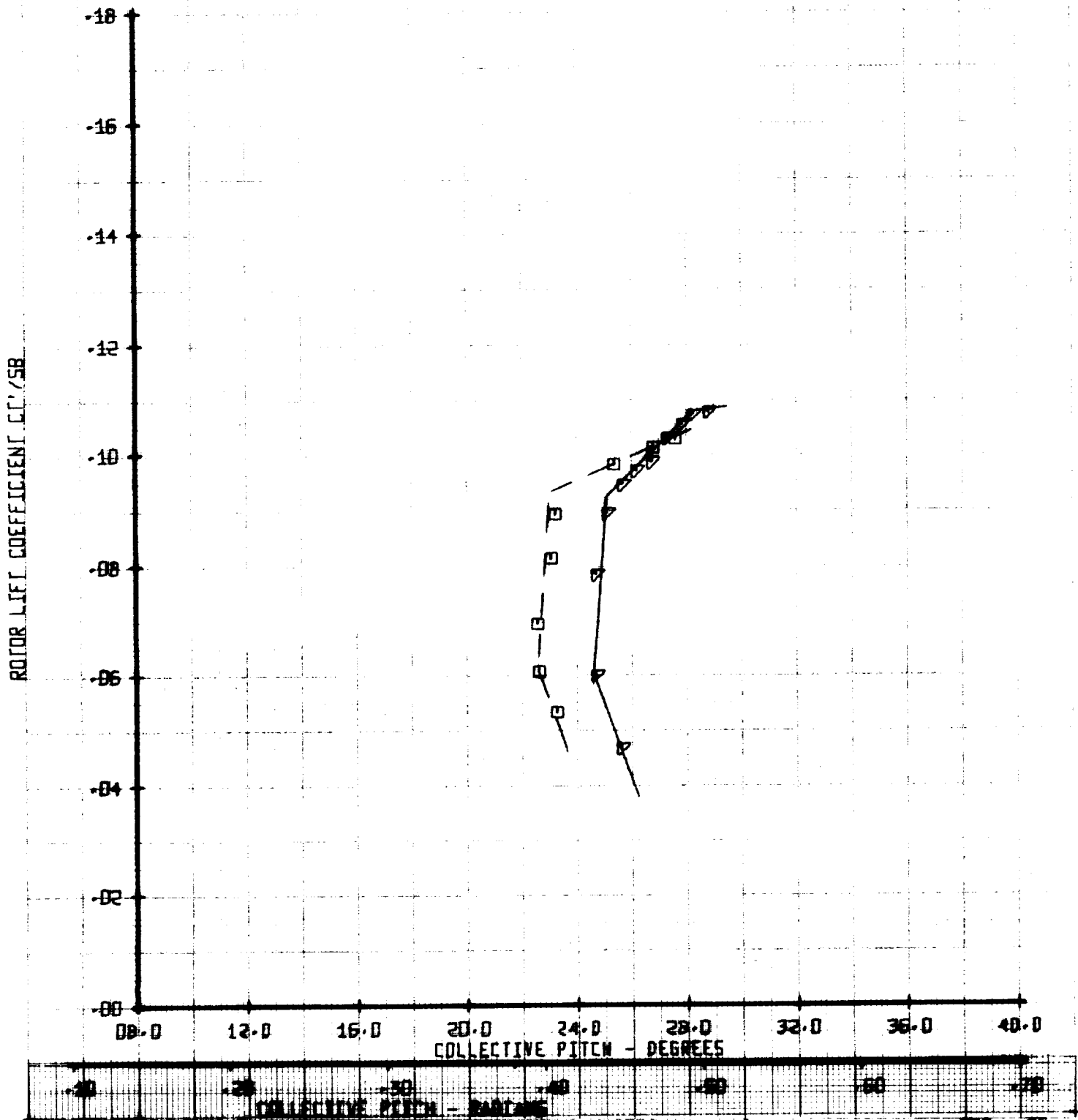


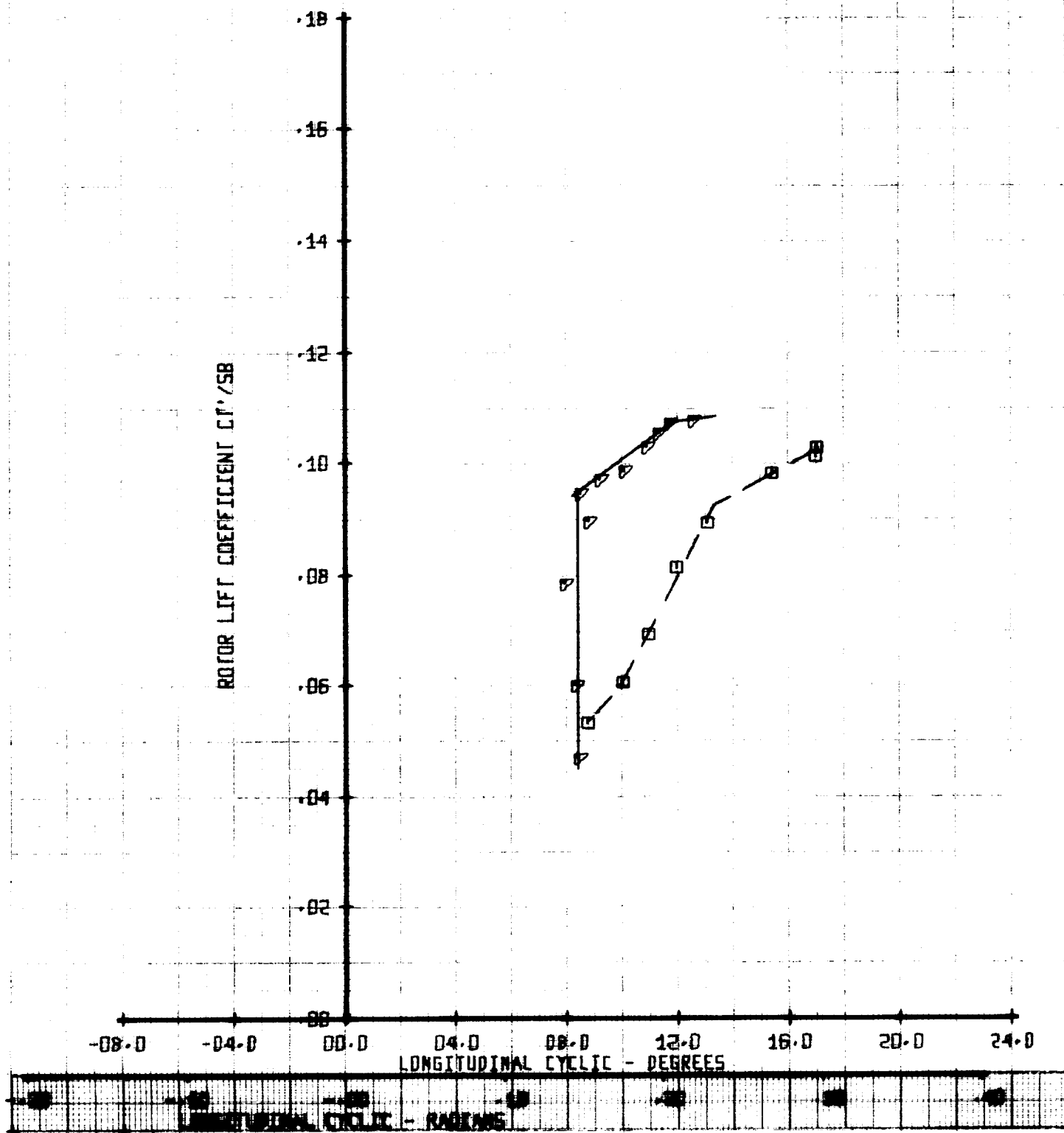
Figure A-176

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	225	.50	.05	310
▽	39	.50	.05	310

ROTOR LIFT COEFFICIENT
VERSUS
LONGITUDINAL CYCLIC



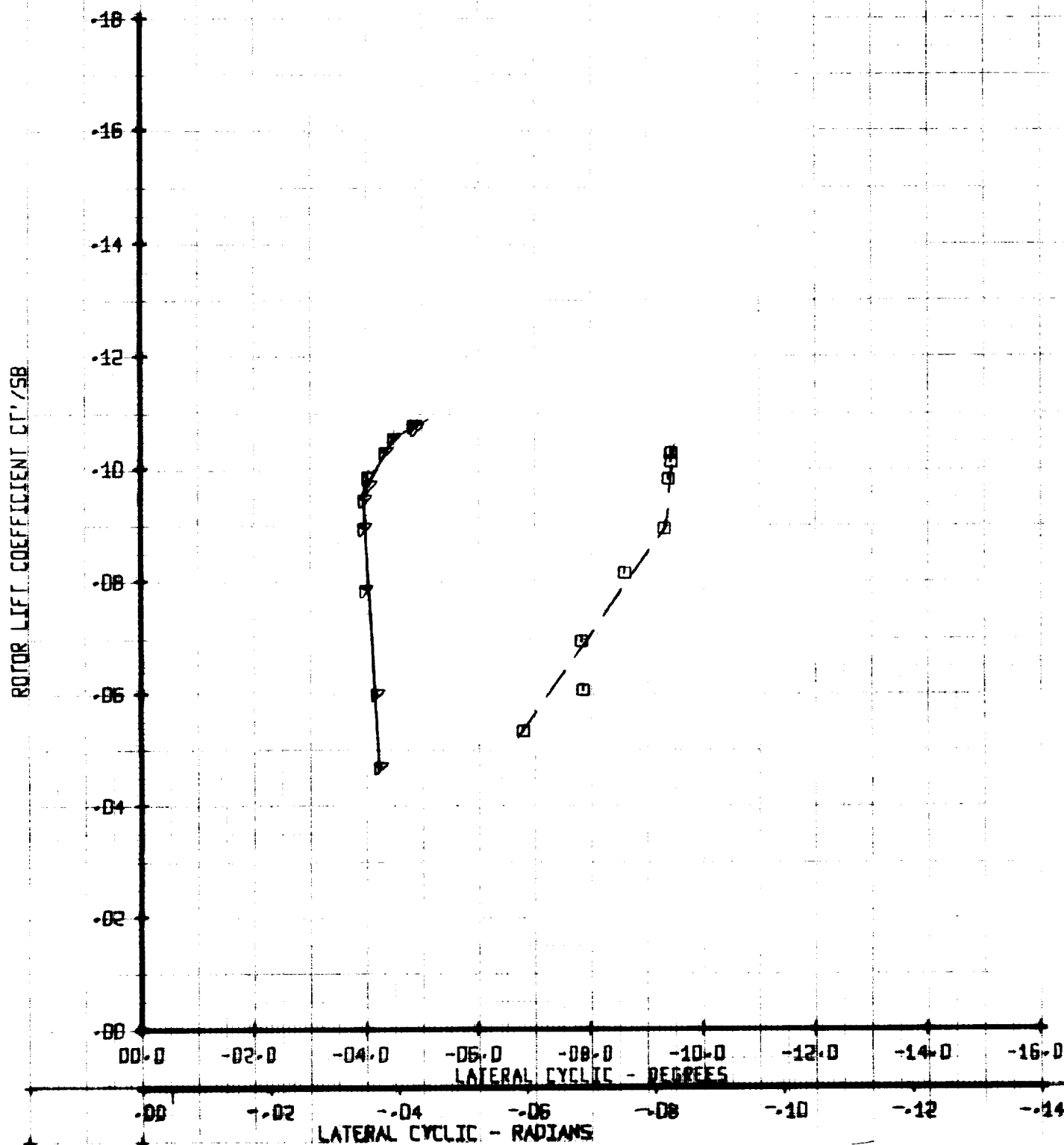
SET 35
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	225	.50	.05	310
▽	39	.50	.05	310

ROTOR LIFT COEFFICIENT
VERSUS
LATERAL CYCLIC

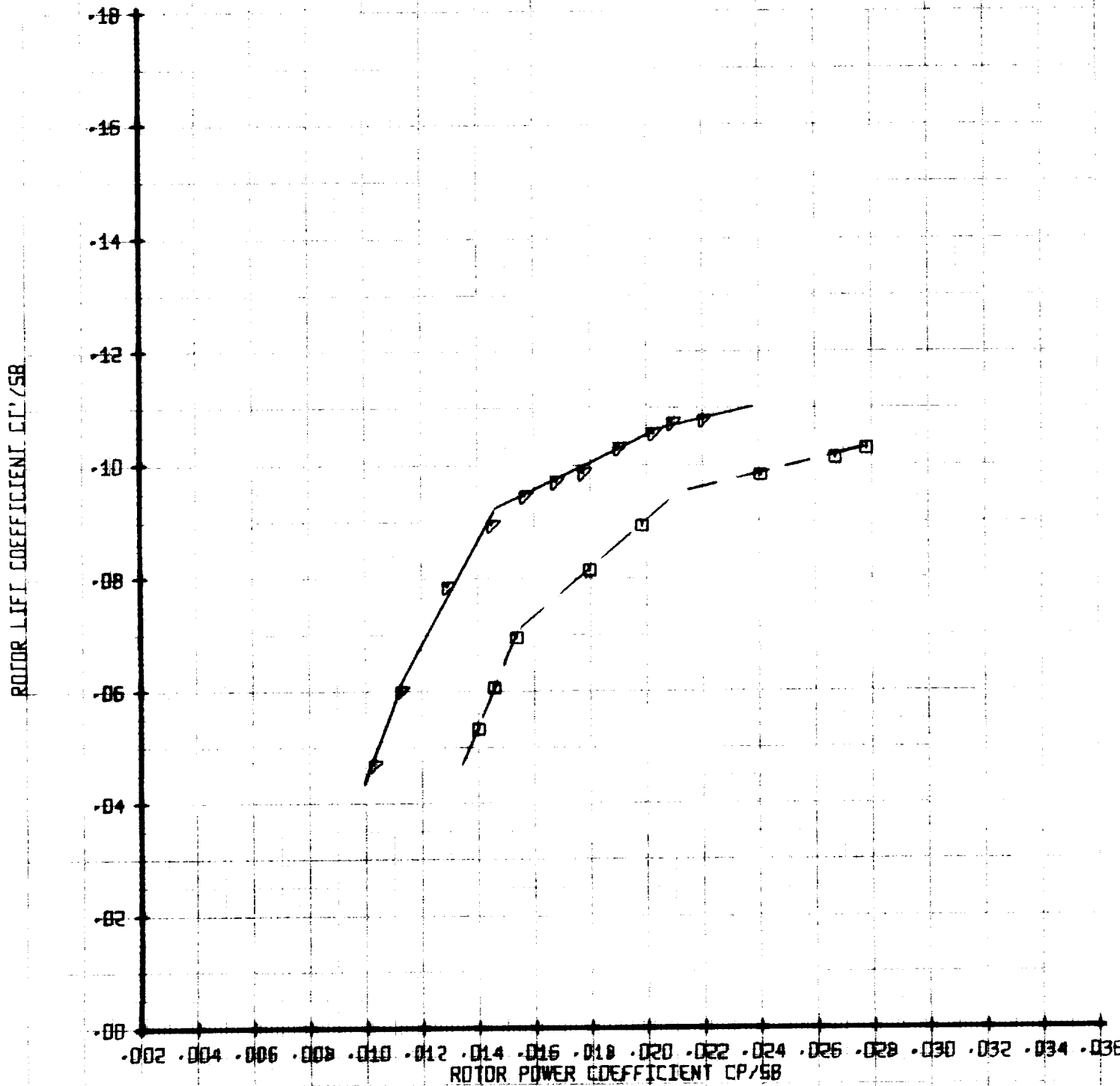


SET 35
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	ML'	X/00258	VTUN
0	225	.50	.05	310
7	39	.50	.05	310

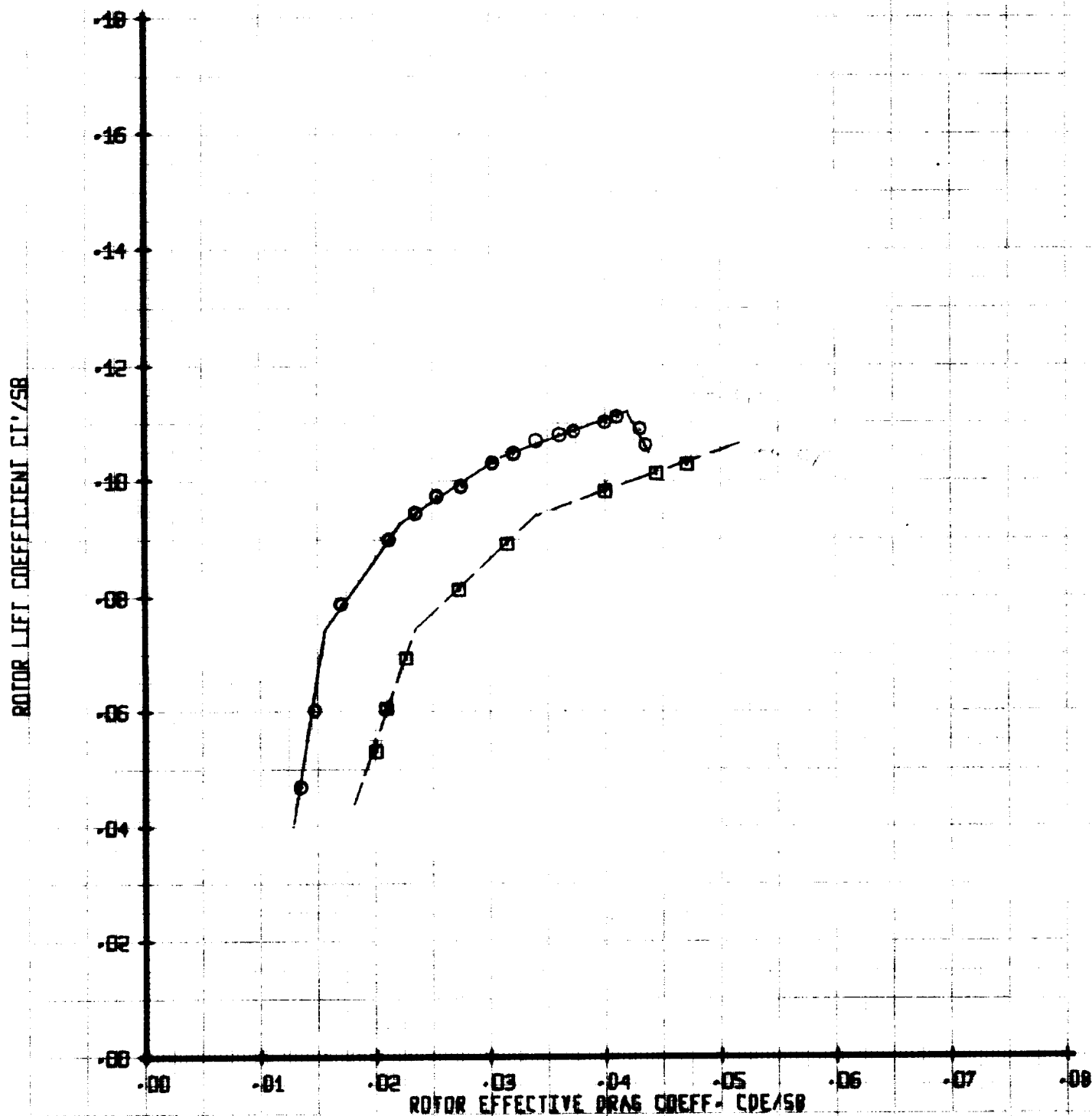
ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM		RUN		LEGEND		MU'		X/DO2SB		YTUN	
0		225				.50		.05		310	
0		39				.50		.05		310	

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT

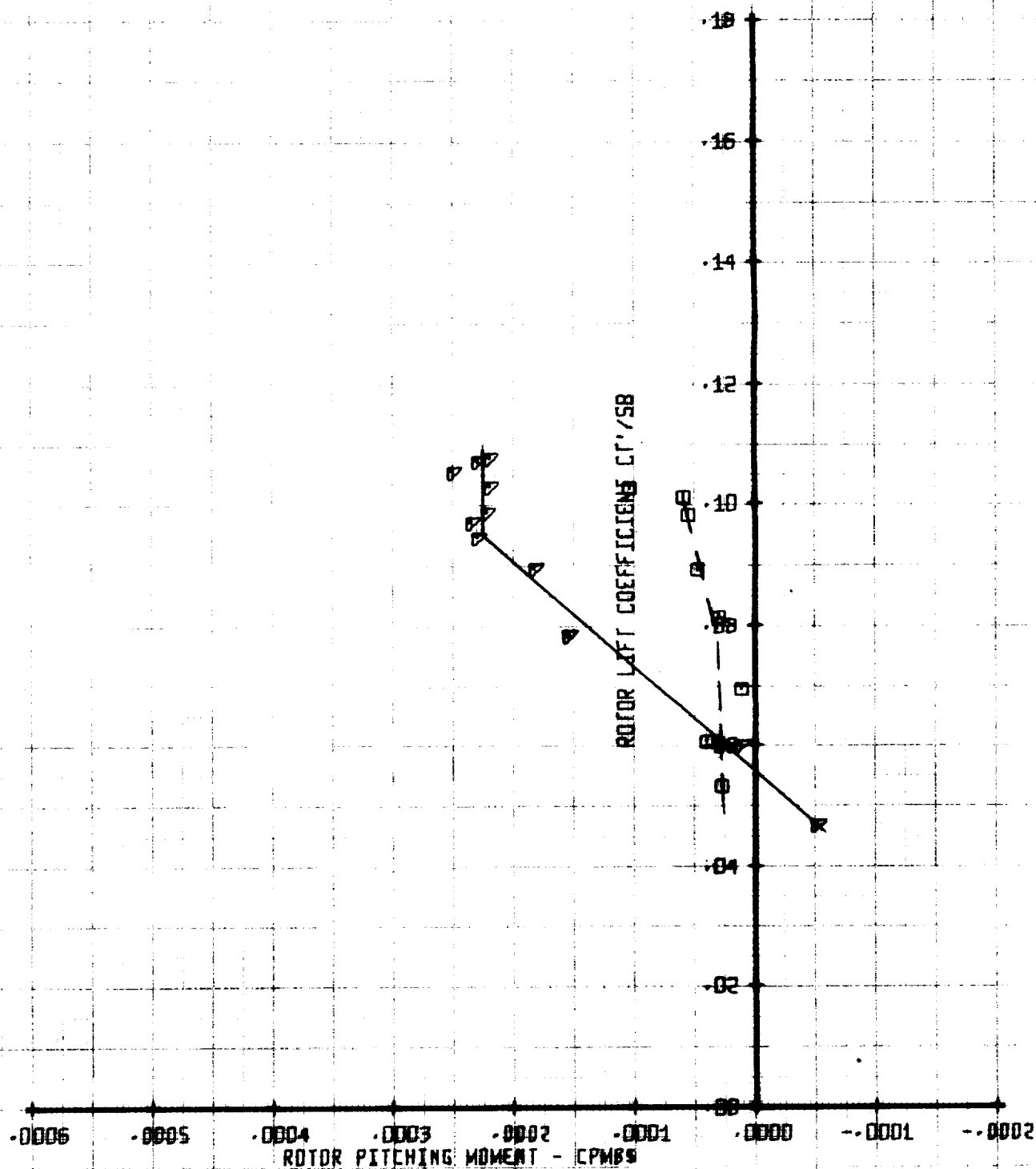


LEFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
0	225	.50	.05	310
7	39	.50	.05	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT



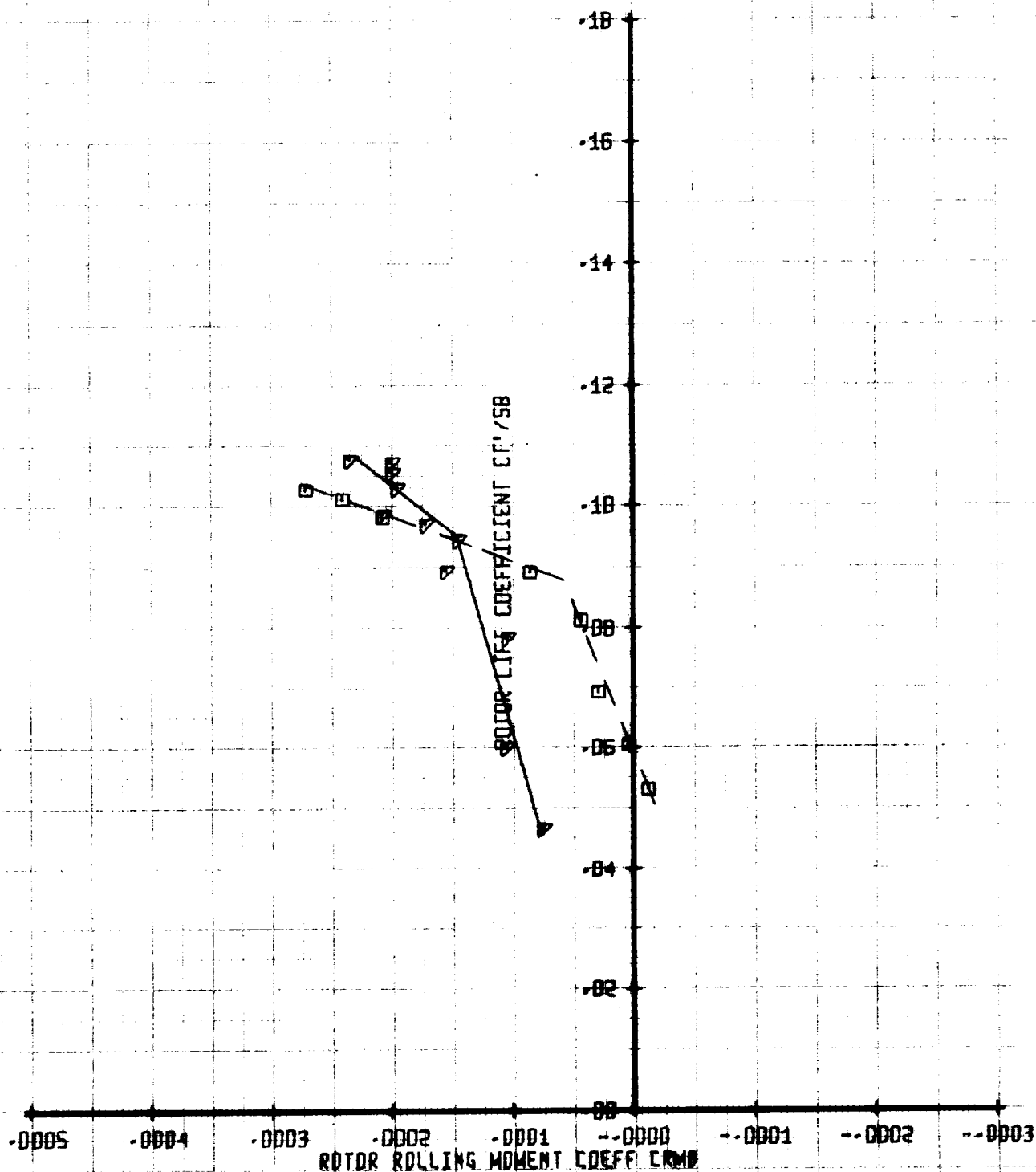
SET 35
BWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	1/00258	VTUN
9	225	.50	.05	310
9	39	.50	.05	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT



SET 35
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

SYM
U
P

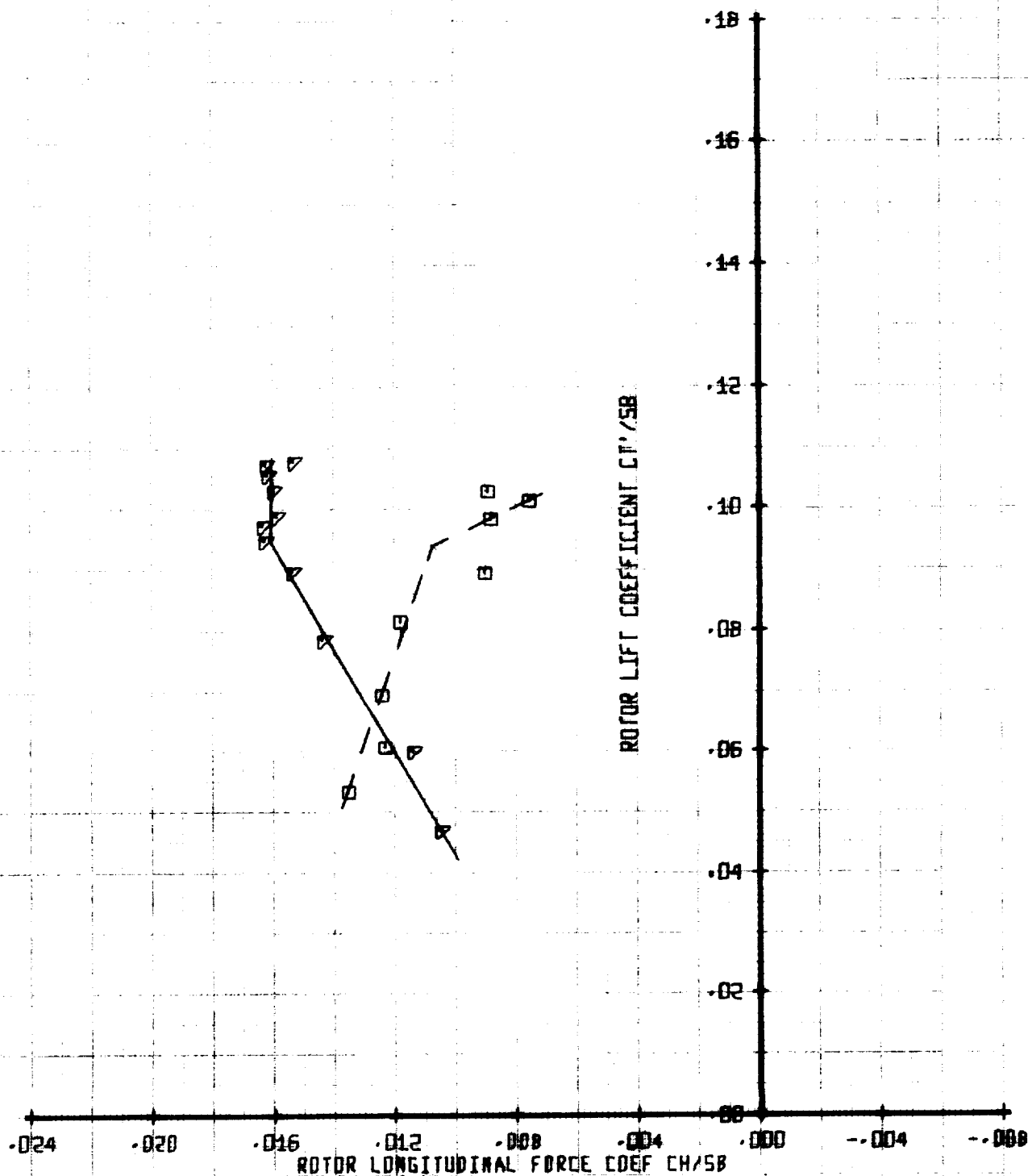
RUN
225
39

MU'
- 50
- 50

X/00258
 .05
 .05

VTJN
310
310

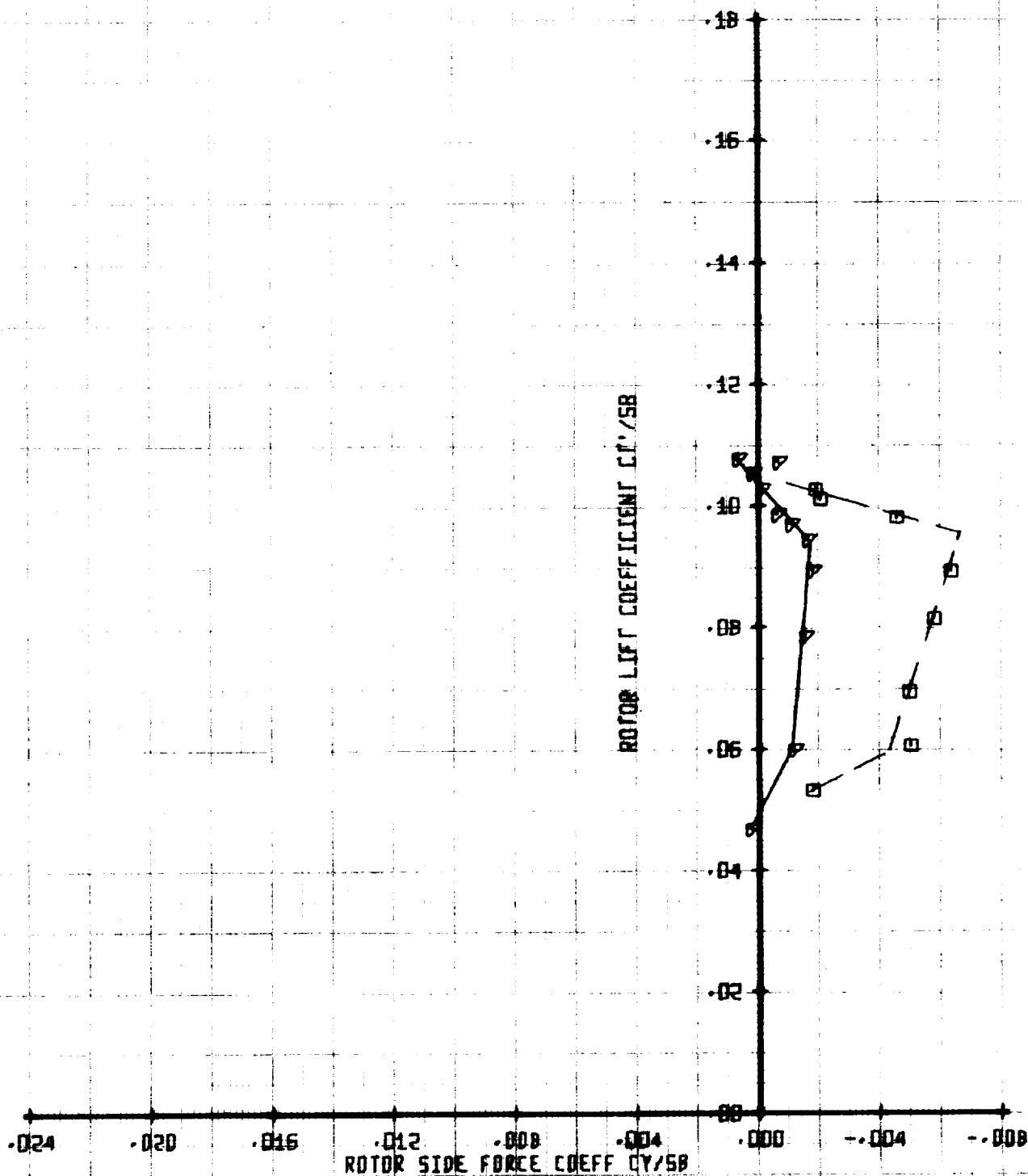
ROTOR LIFT COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU	X/00258	VTUN
□	225	.50	.05	310
▽	39	.50	.05	310

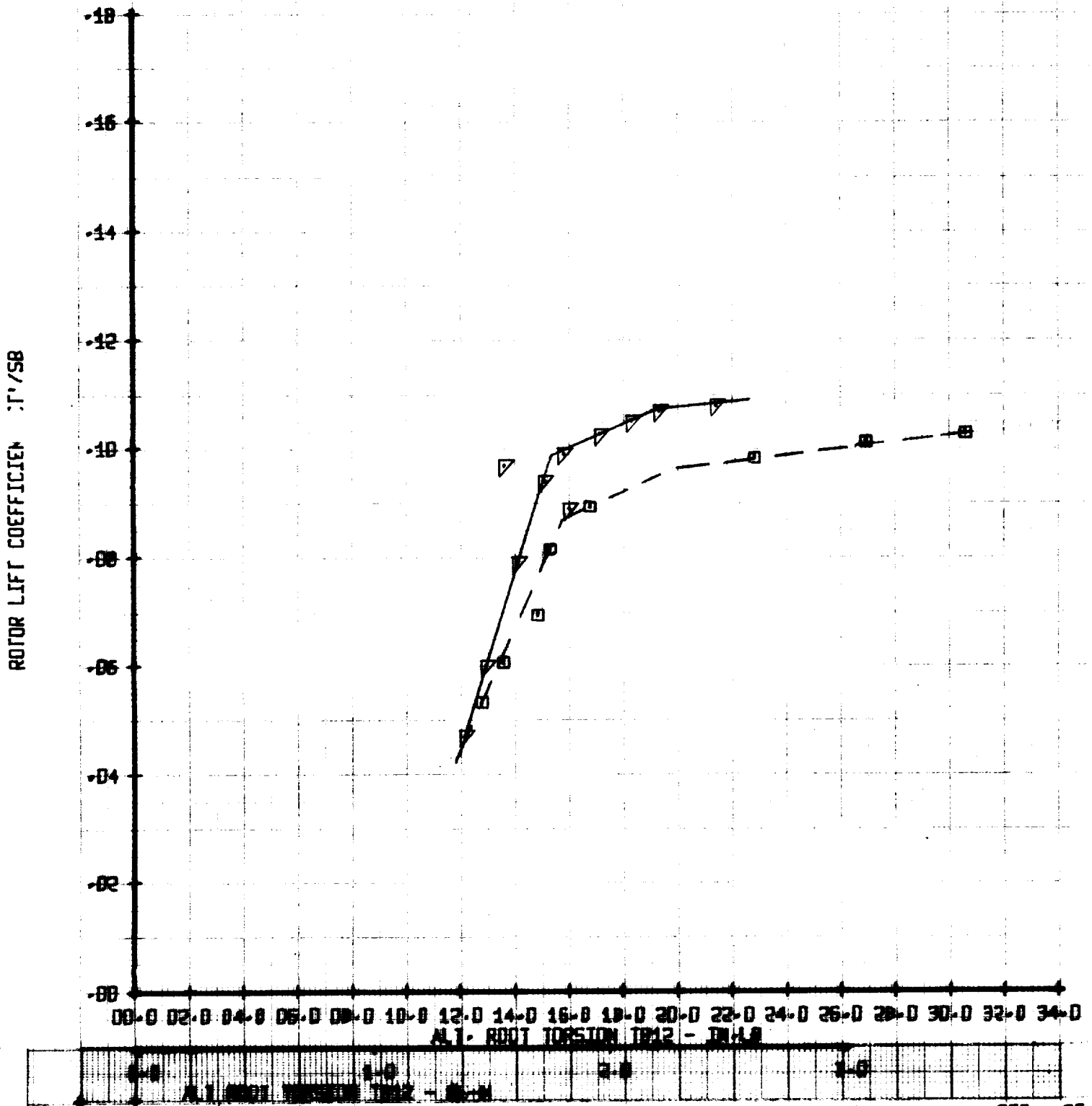
ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CM-47B ROTOR
LIFT LIMIT TESTING

LEGEND		MI'	X/00258	VTUN
SYM	RUN	.50	.05	310
0	225	.50	.05	310
7	39			

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

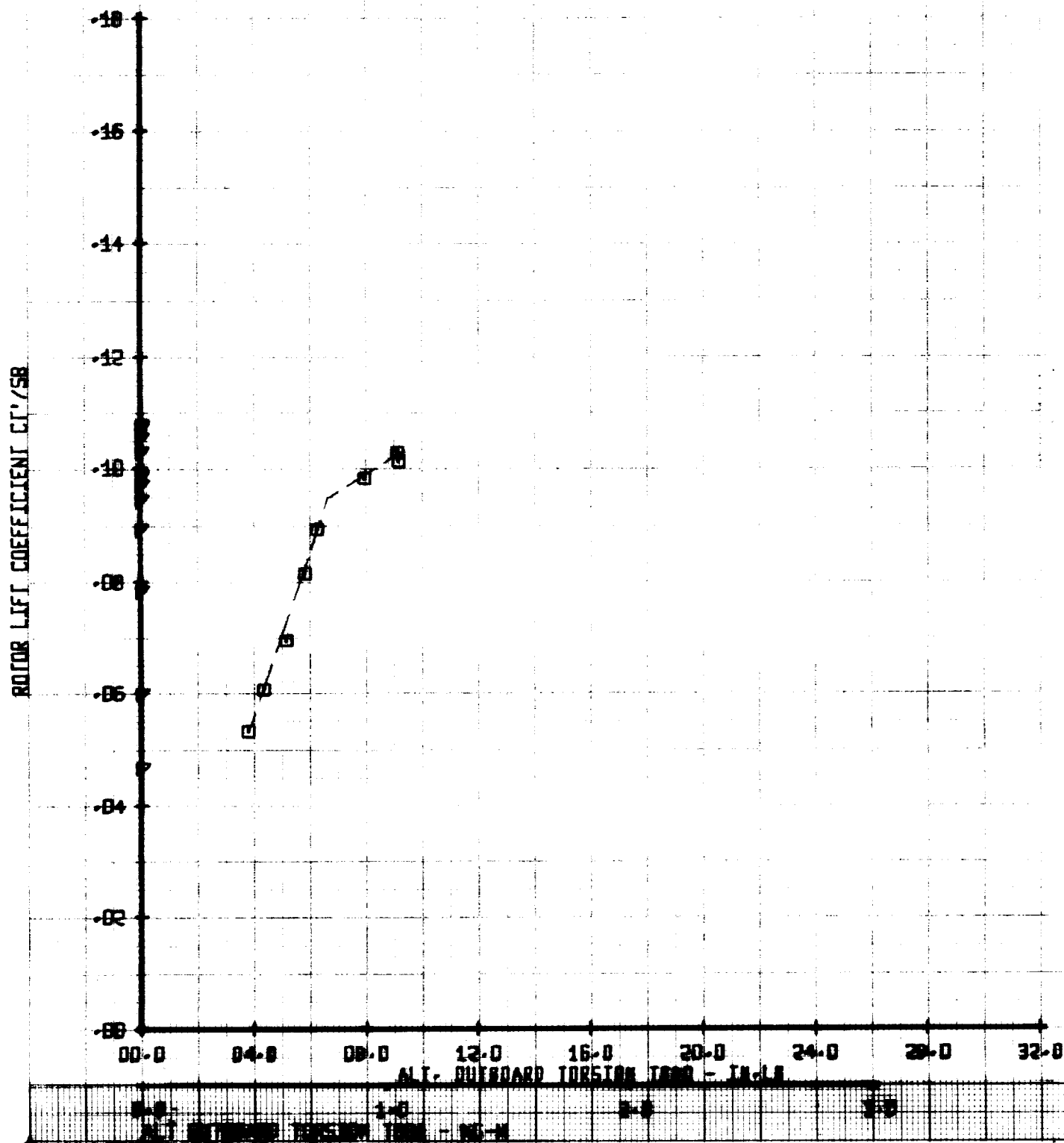


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM
0
7RUN
225
39MU:
.50
.50X/00258
.05
.05YTUN
310
310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB80



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM
□
▽

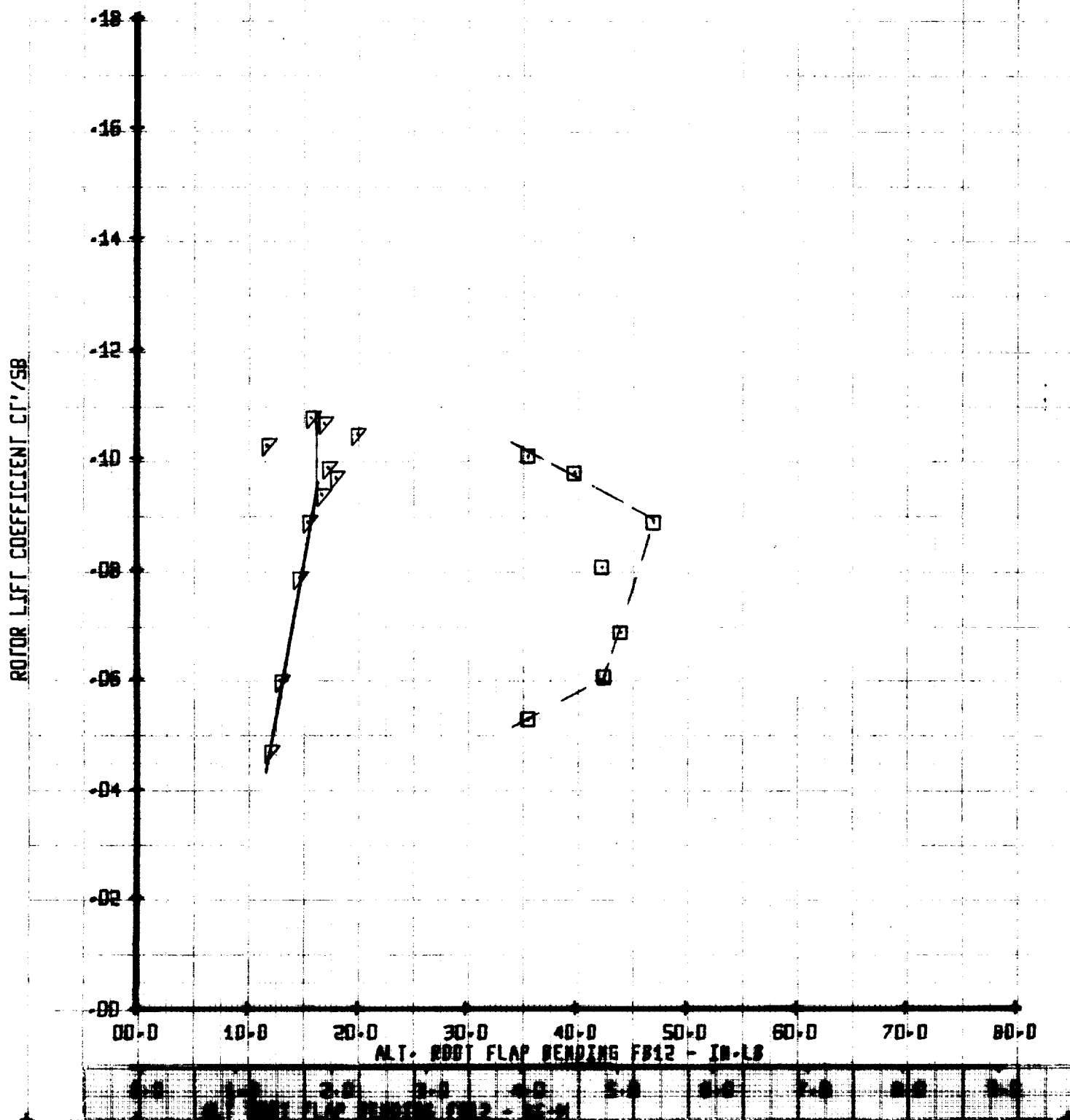
RUN
225
39

MU'
.50
.50

X/002SB
.05
.05

VTUN
310
310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

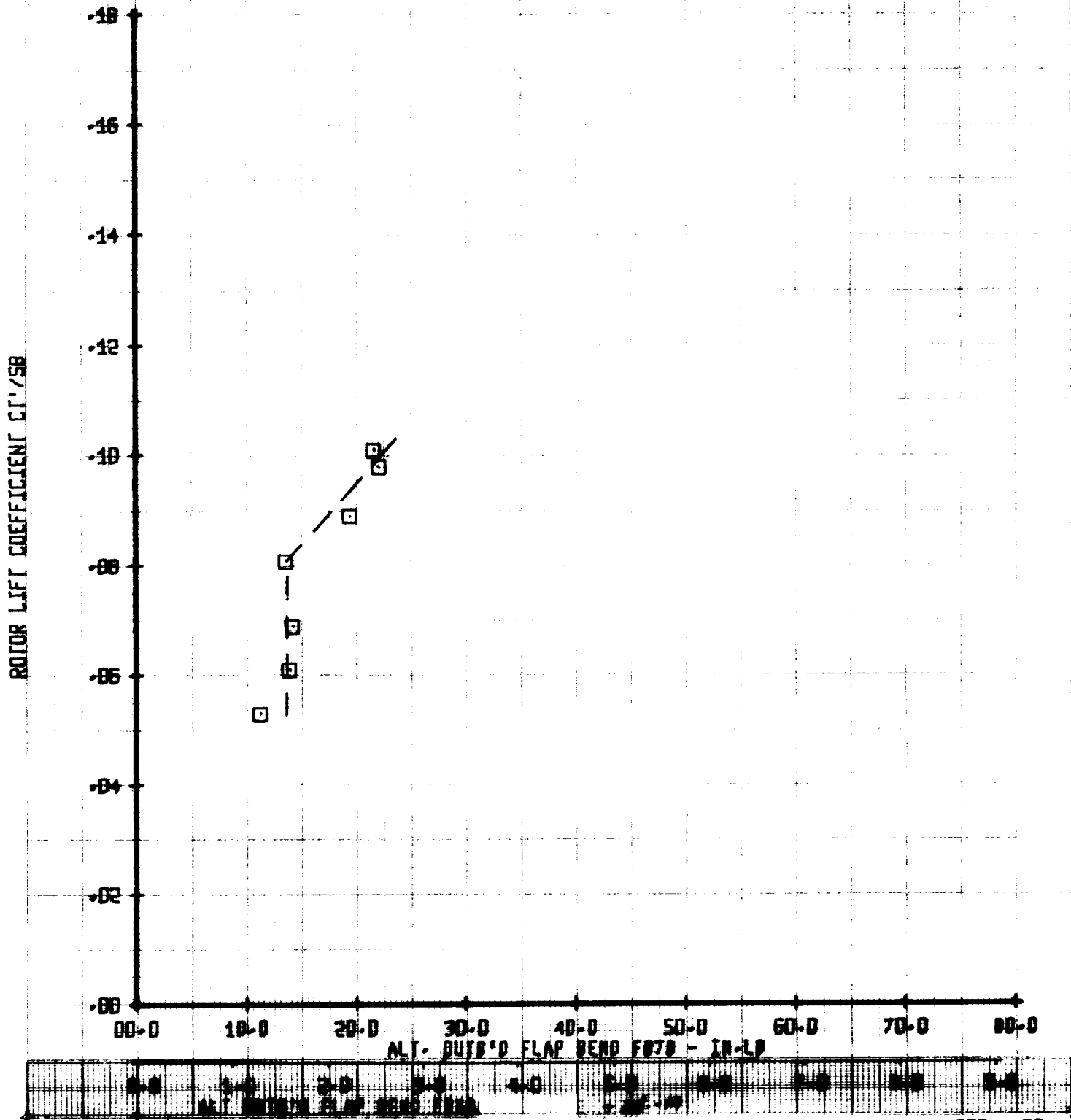


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'	1/00258	VTUN
□	225	.50	.05	310
□	39	.50	.05	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD FLAP BENDING FB78

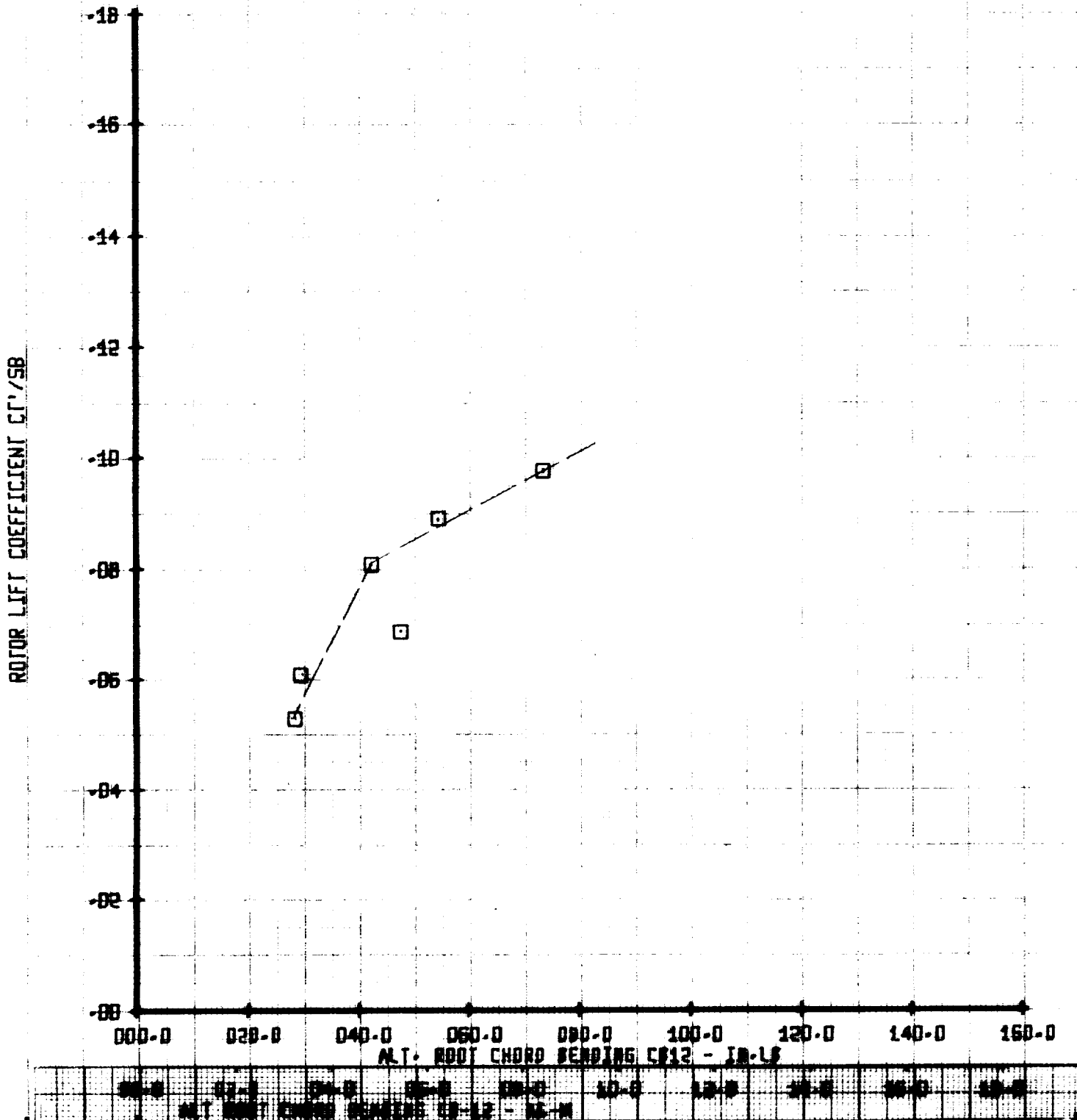


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	NUM	MU'	X/00258	YTUN
0	225	.50	.05	310
7	39	.50	.05	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU'	X/DD258	YTUN
□	225	.50	.05	310
◇	261	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PROPULSIVE FORCE COEFFICIENT

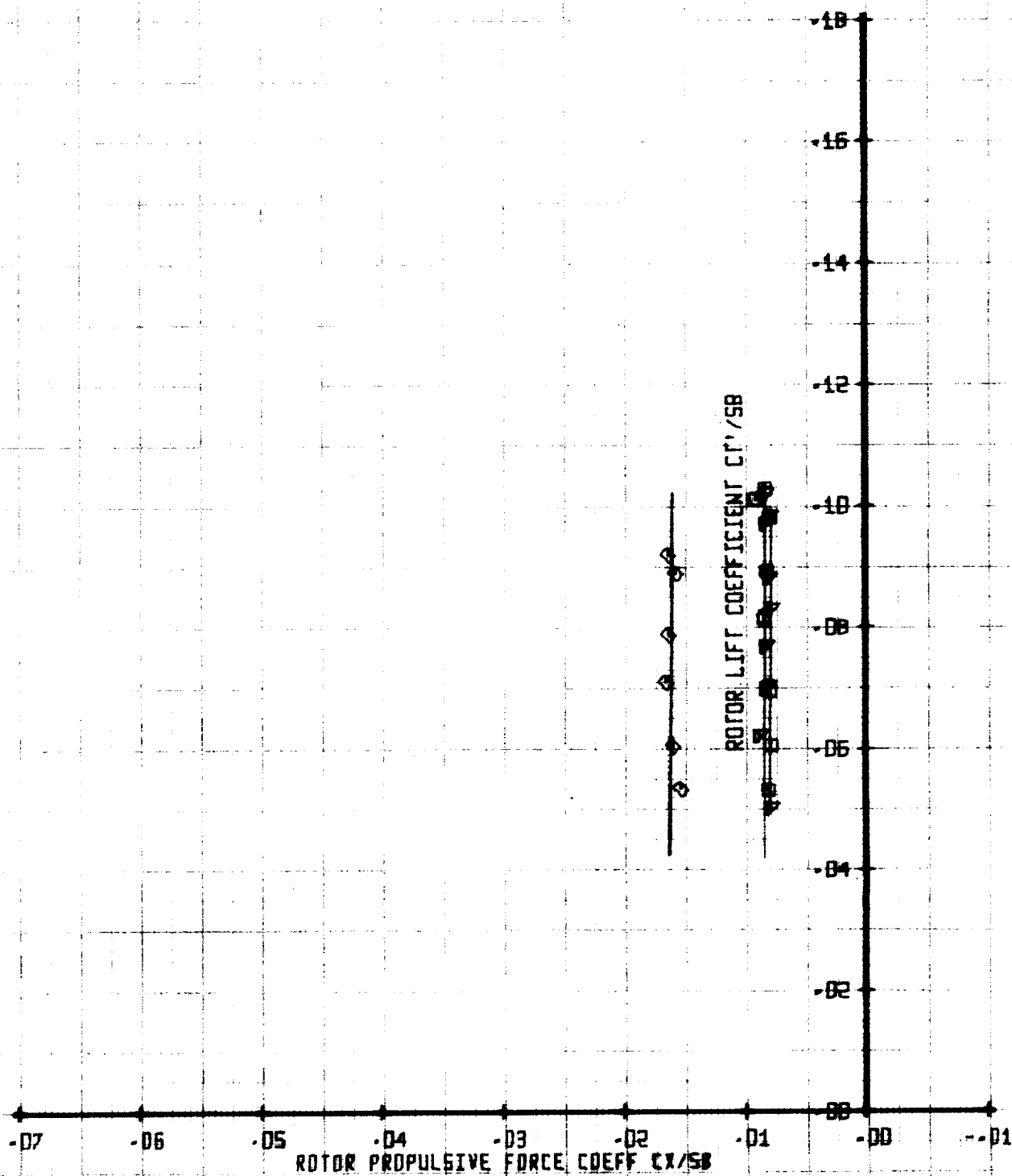


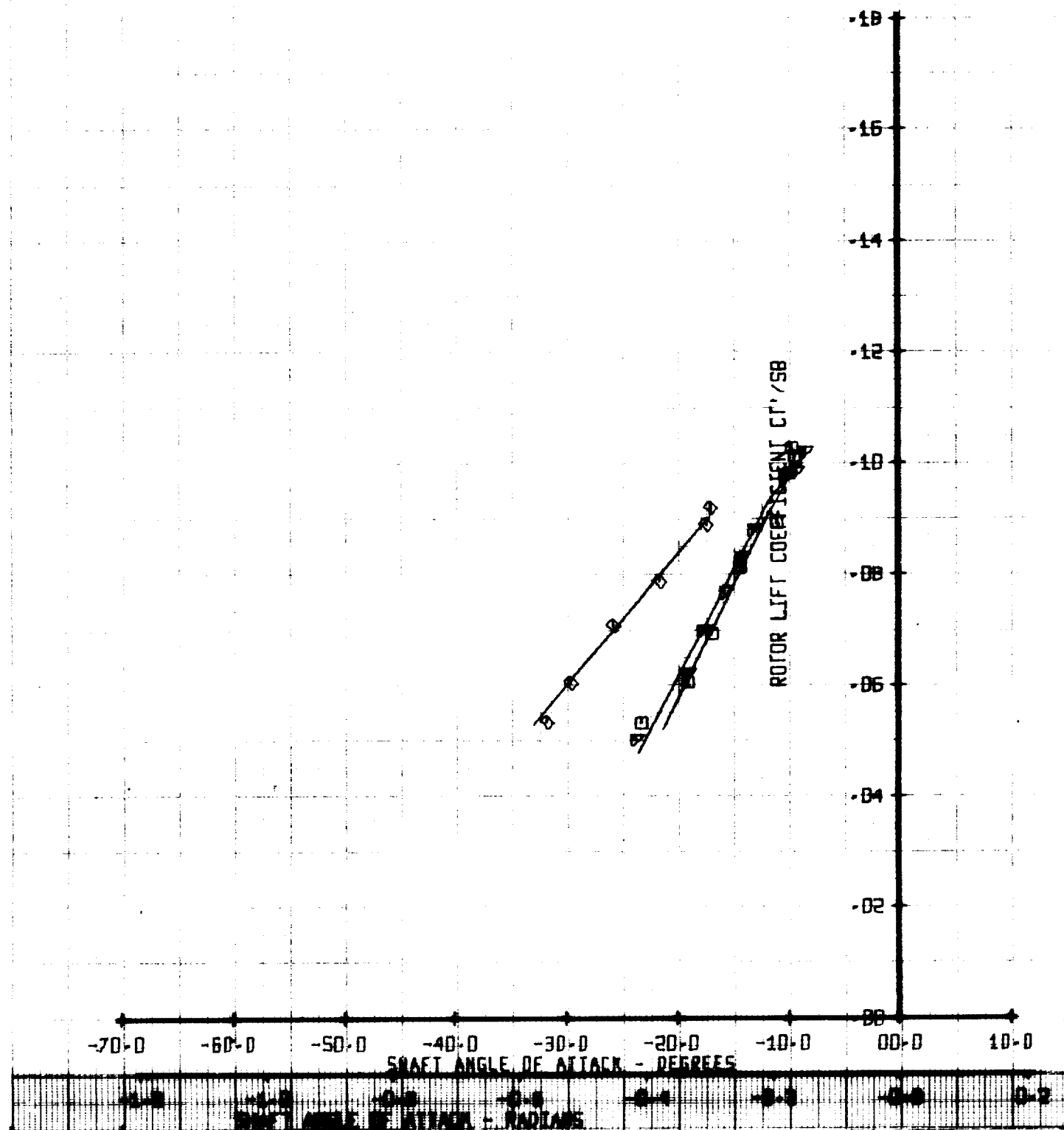
Figure A-189

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	225	.50	.05	310
◇	261	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	225	.50	.05	310
▽	261	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH

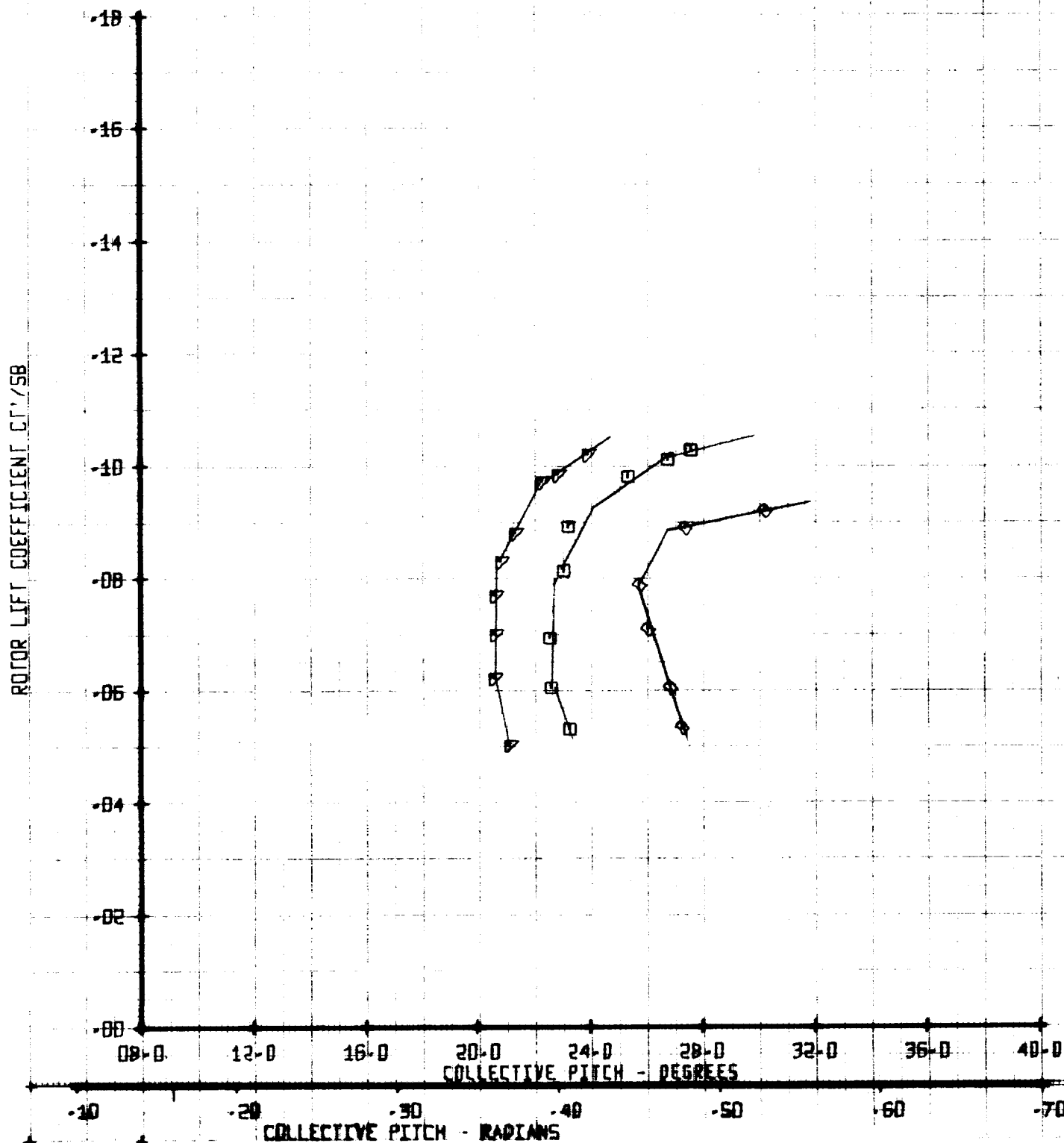


Figure A-191

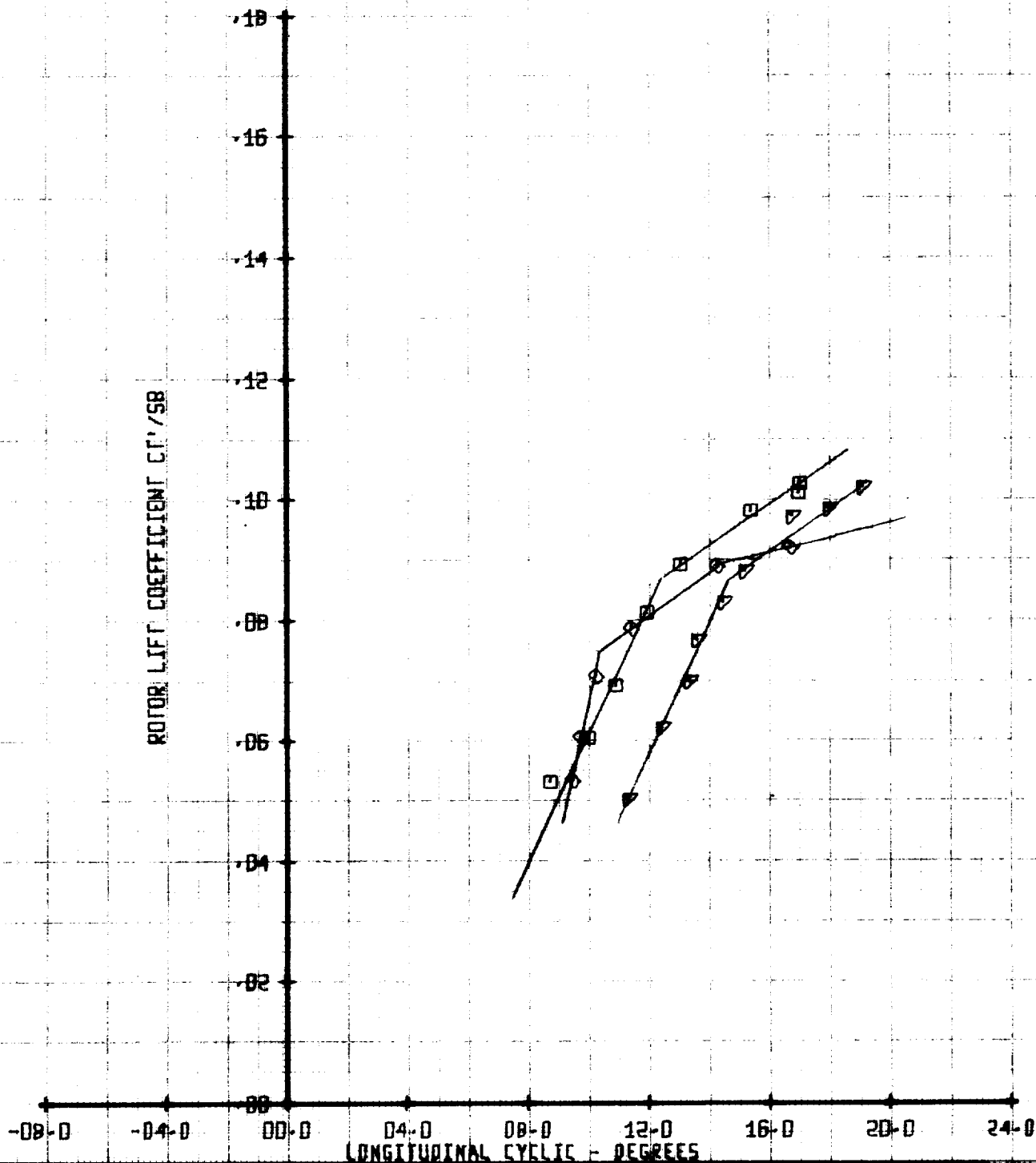
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	225	.90	.05	310
▽	261	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
LONGITUDINAL CYCLIC

ROTOR LIFT COEFFICIENT C_l'/SB



LONGITUDINAL CYCLIC - DEGREES

LONGITUDINAL CYCLIC - RADIANS

SET 36
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DD2SB	VTUN
□	225	.50	.05	310
▽	261	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
LATERAL CYCLIC

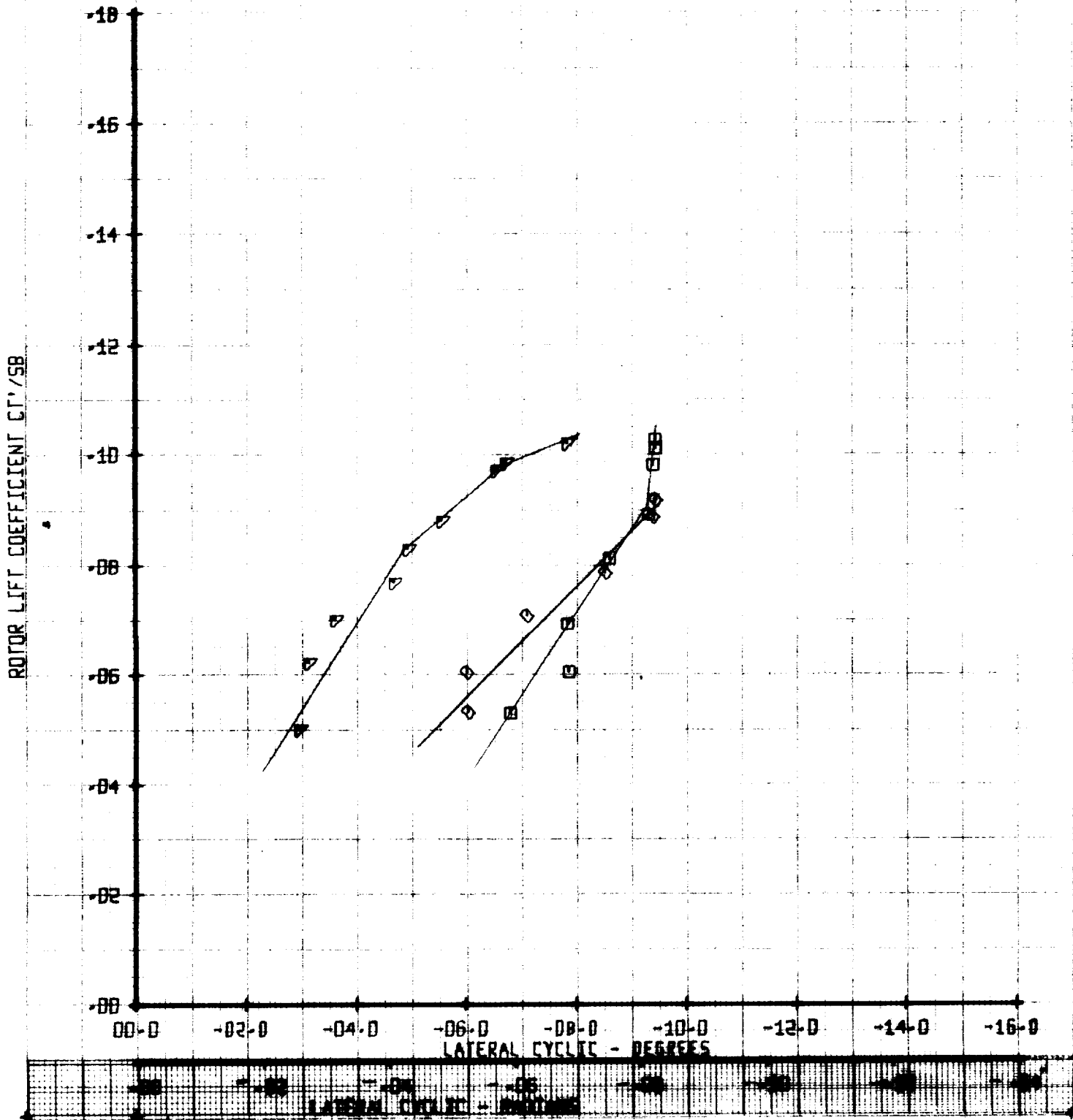
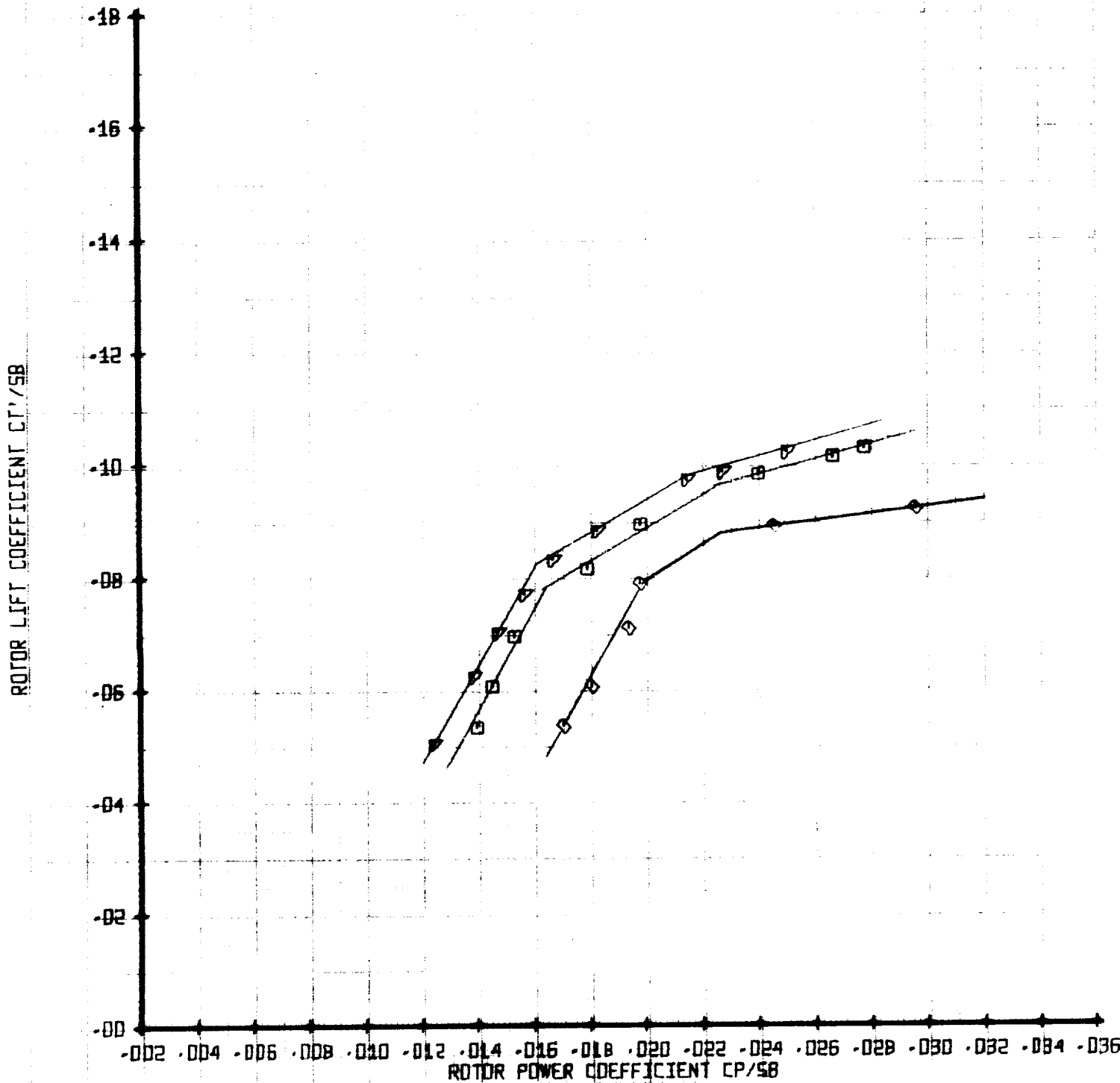


Figure A-193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU'	X/00258	VTUN
□	225	.50	.05	310
△	261	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT



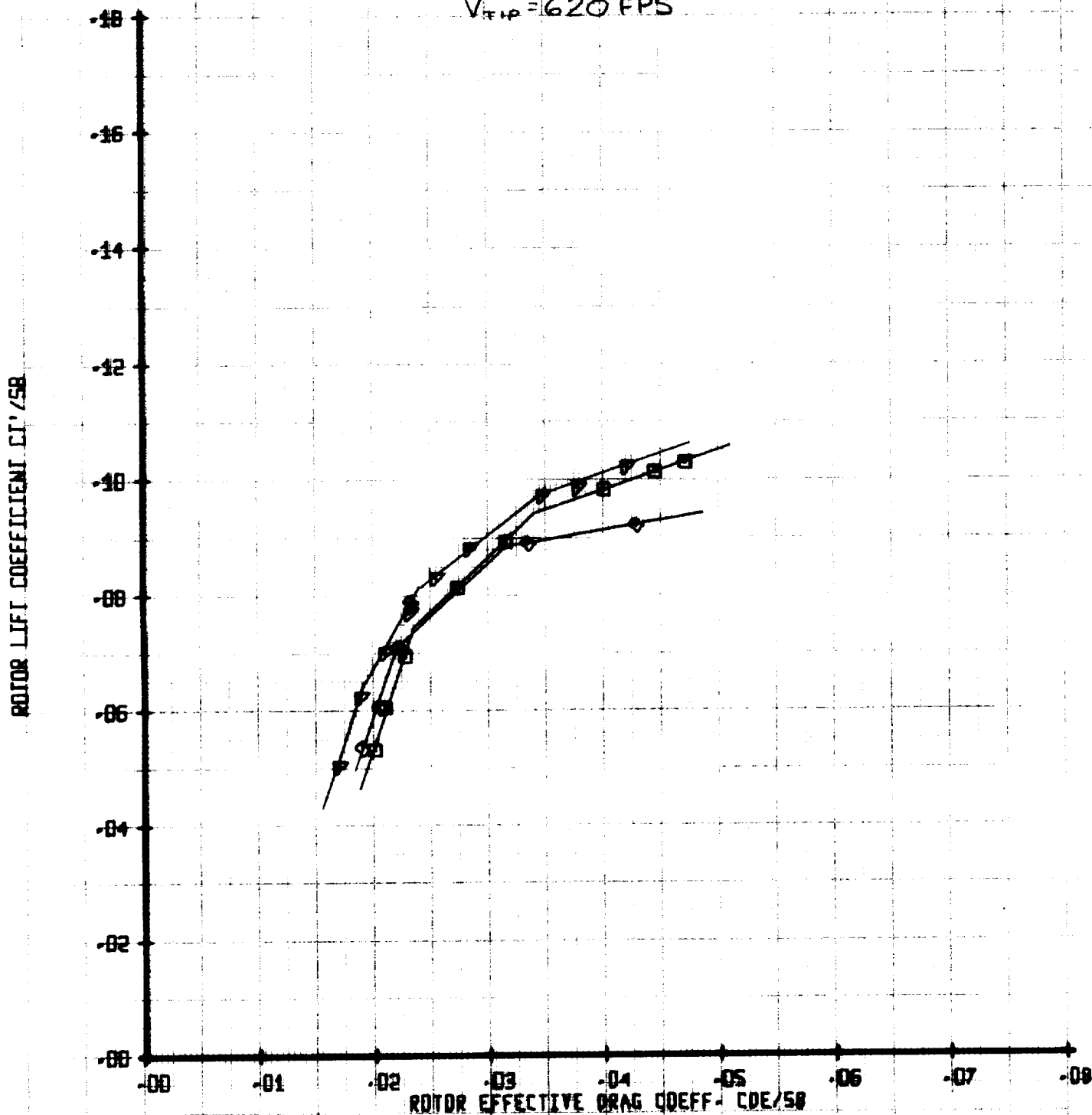
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	Y/TUM
□	225	.50	.05	310
▽	261	.50	.05	310
◆	236	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT

$V_{tip} = 620 \text{ FPS}$

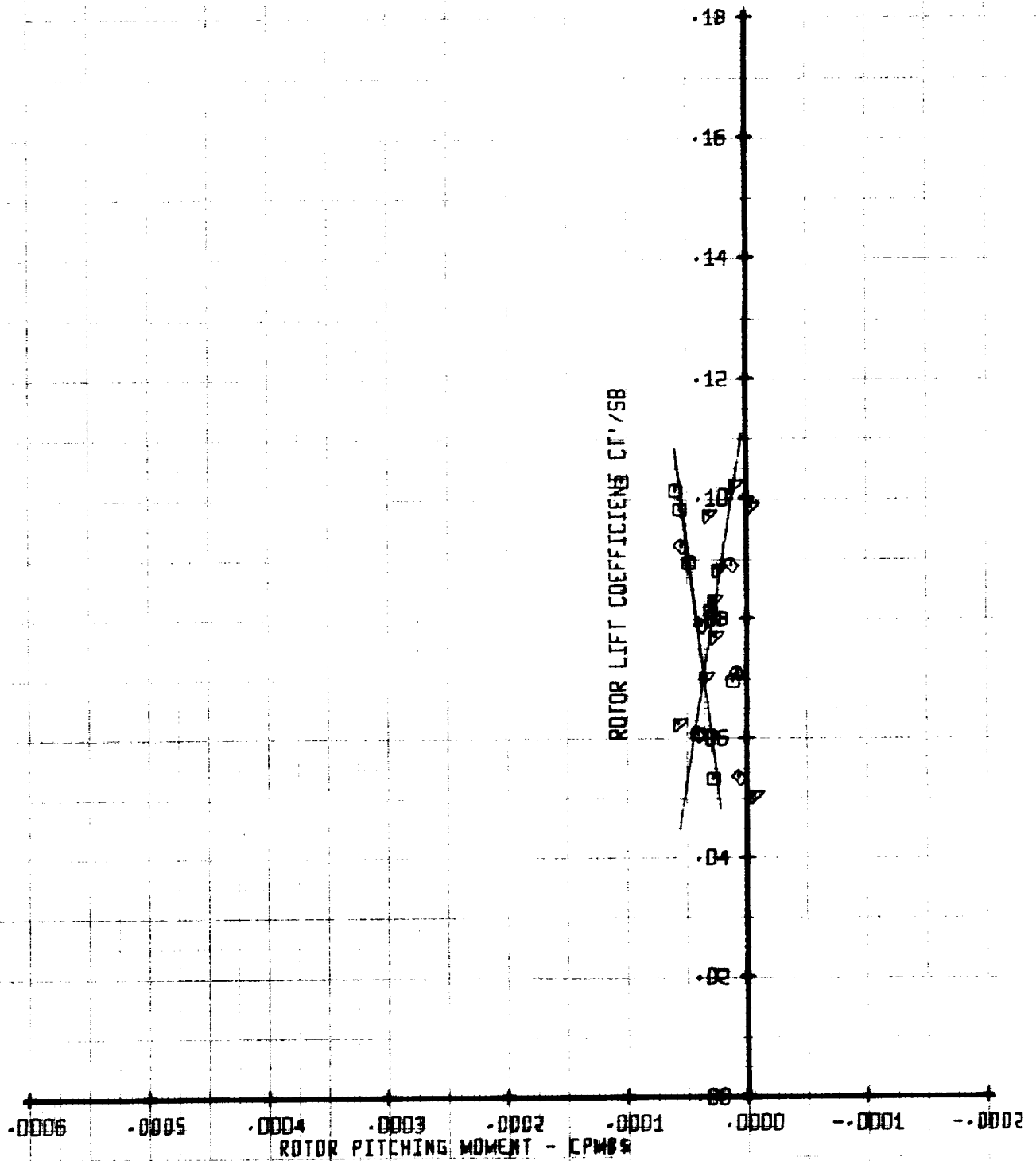


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/DD2SB	YTLN
□	225	.50	.05	310
◇	261	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU'	X/00258	VTUN
□	225	.50	.05	310
▽	261	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT

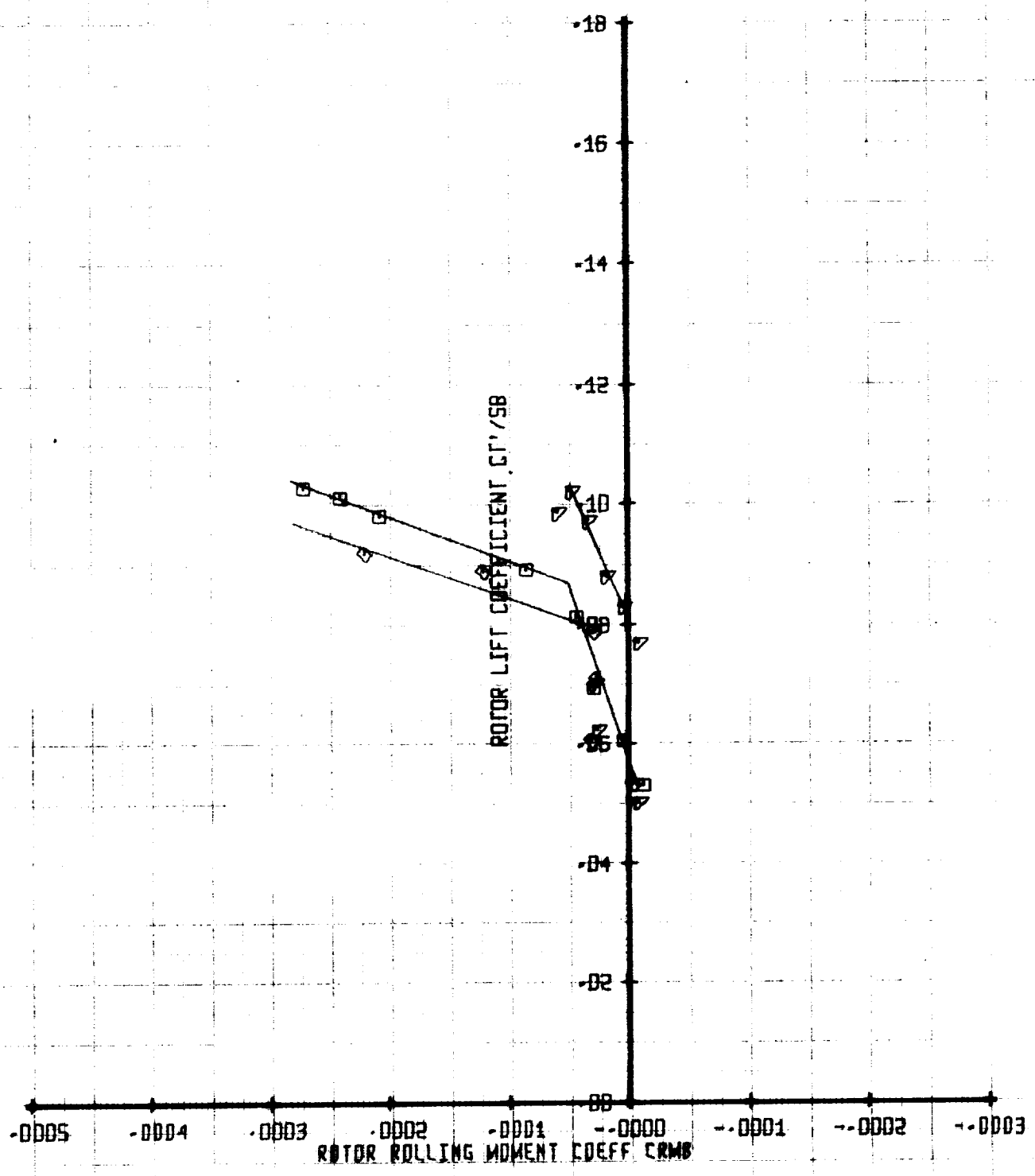


Figure A-197

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MU'	X/DD258	VTUN
□	225	.50	.05	310
△	261	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT

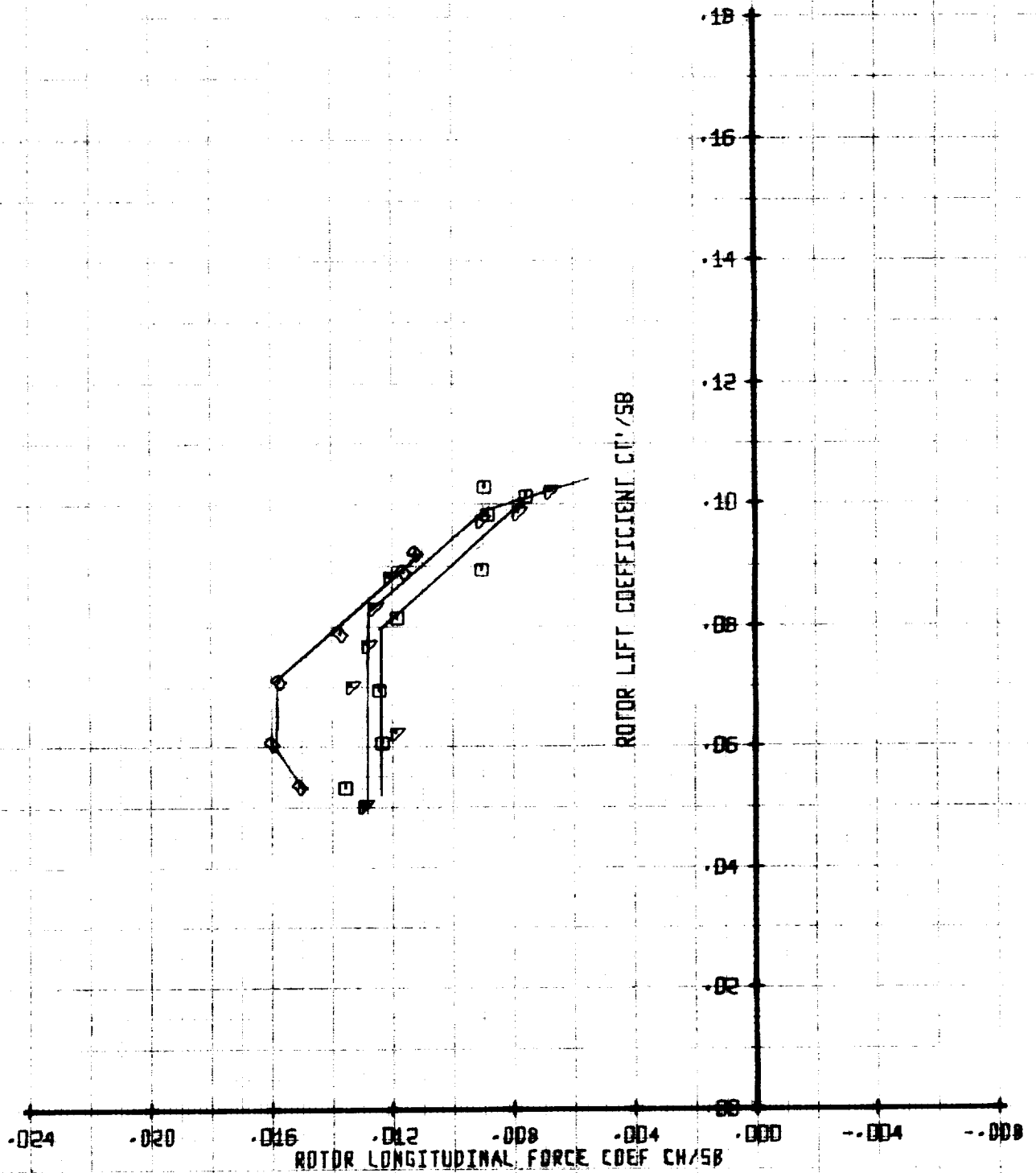


Figure A-198

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DD258	Y/DUN
□	225	.50	.05	310
◇	261	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT

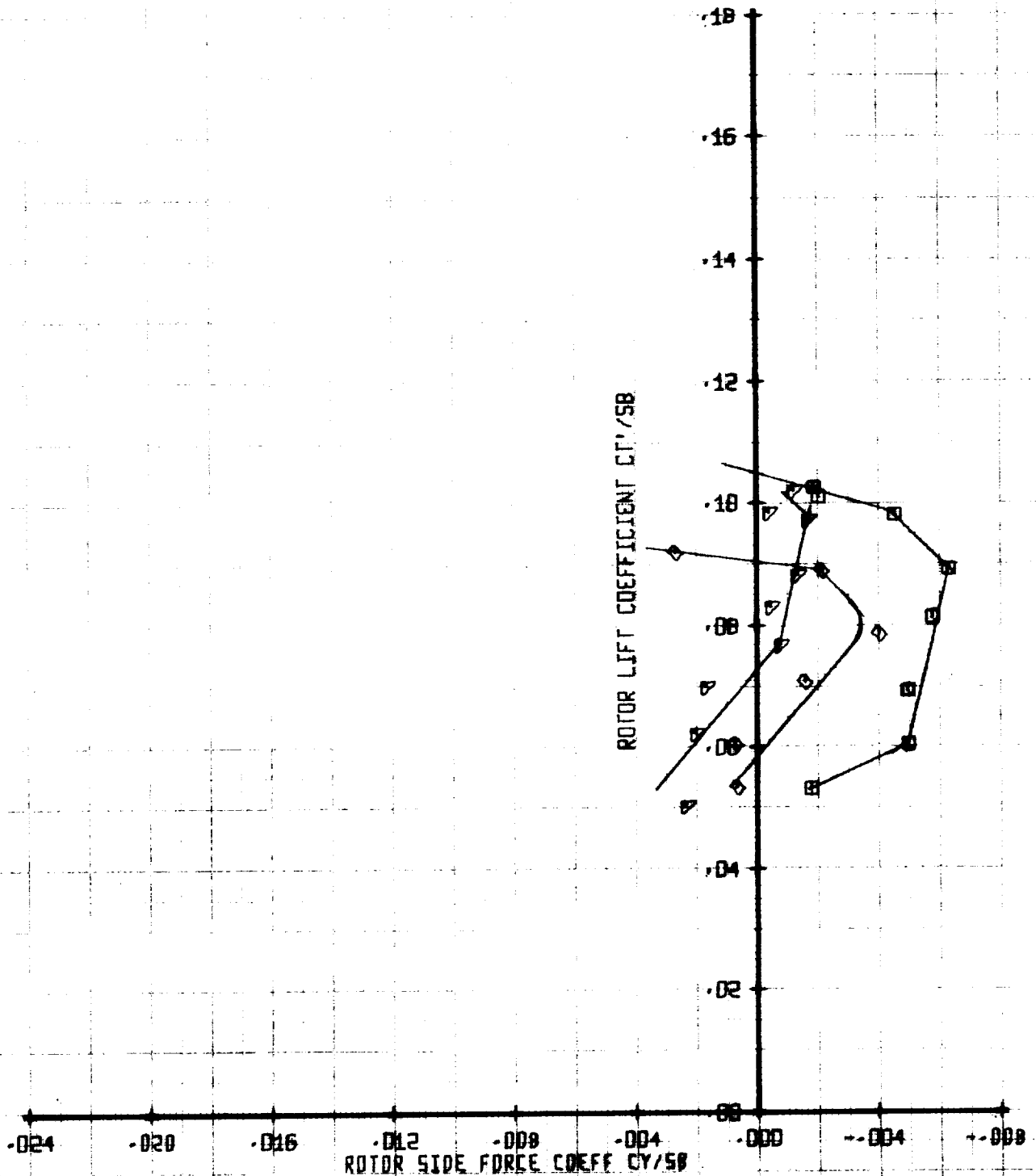


Figure A-199

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'	X/00258	Y/TUM
□	225	.50	.05	310
△	261	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

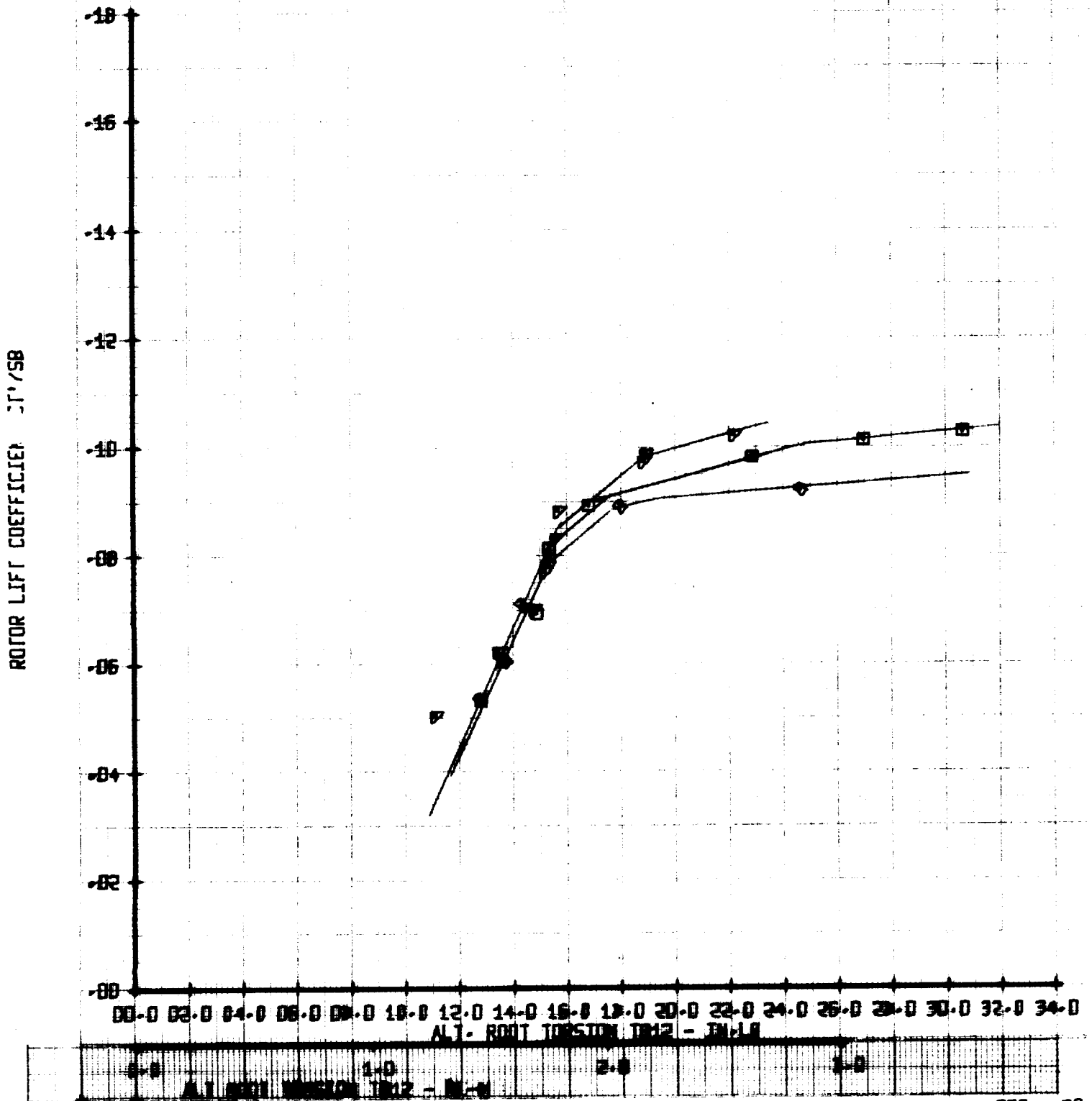


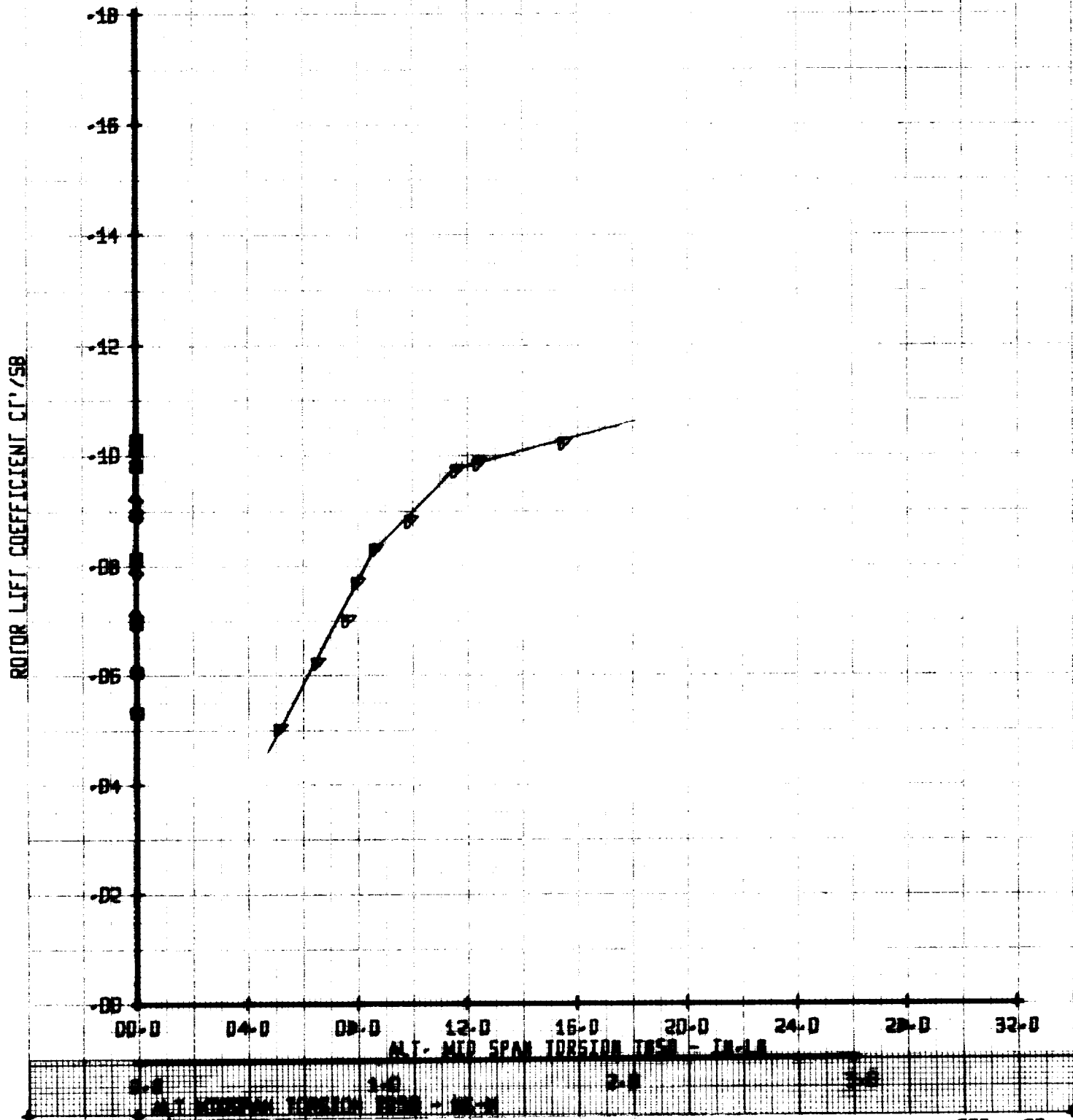
Figure A-200

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	1/00298	VTUN
□	225	.50	.05	310
▽	261	.50	.05	310
△	226	.50	.10	210

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50

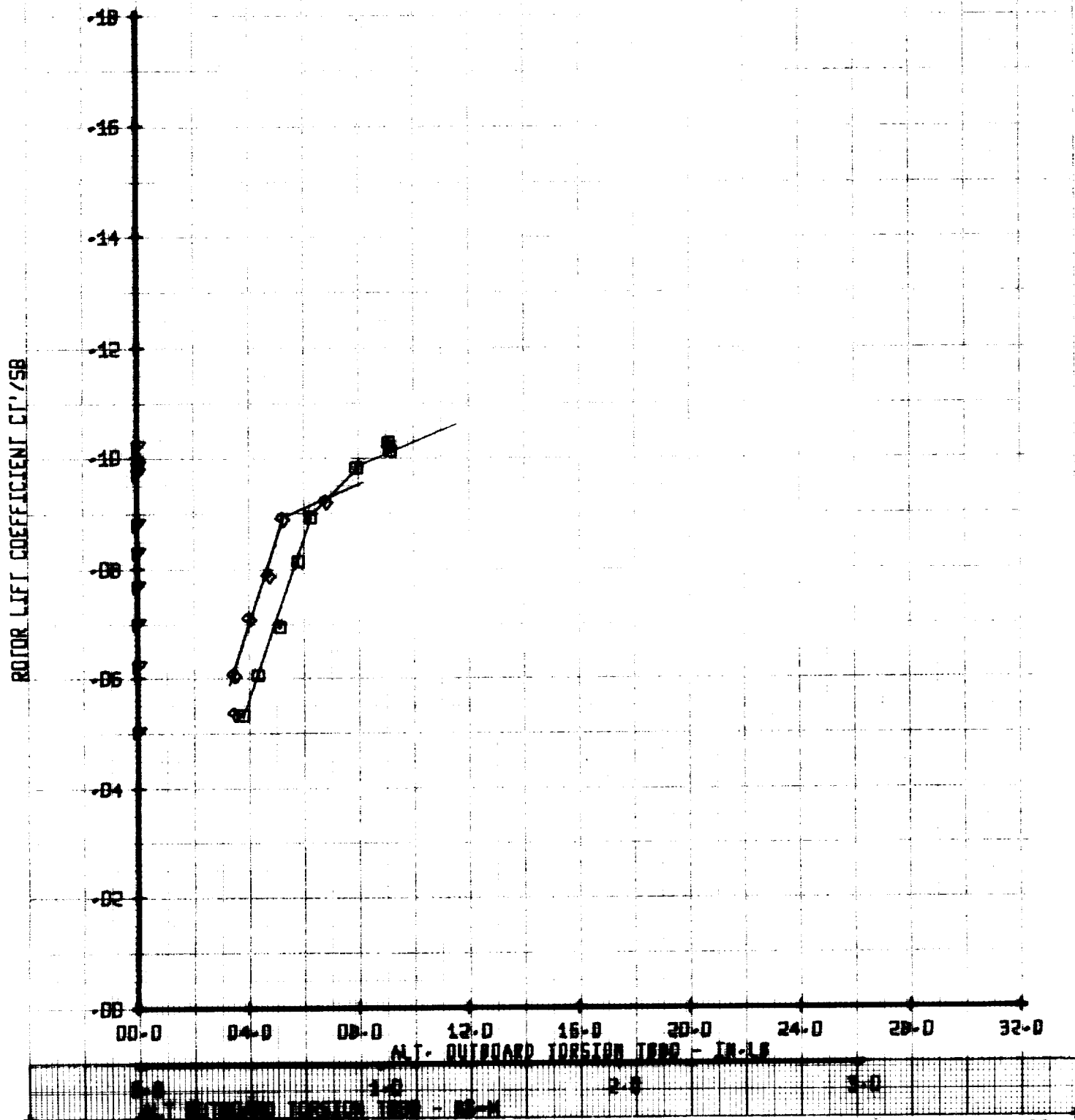


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/D02SB	VTUM
○	225	.50	.05	310
□	261	.50	.05	310
◆	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB50

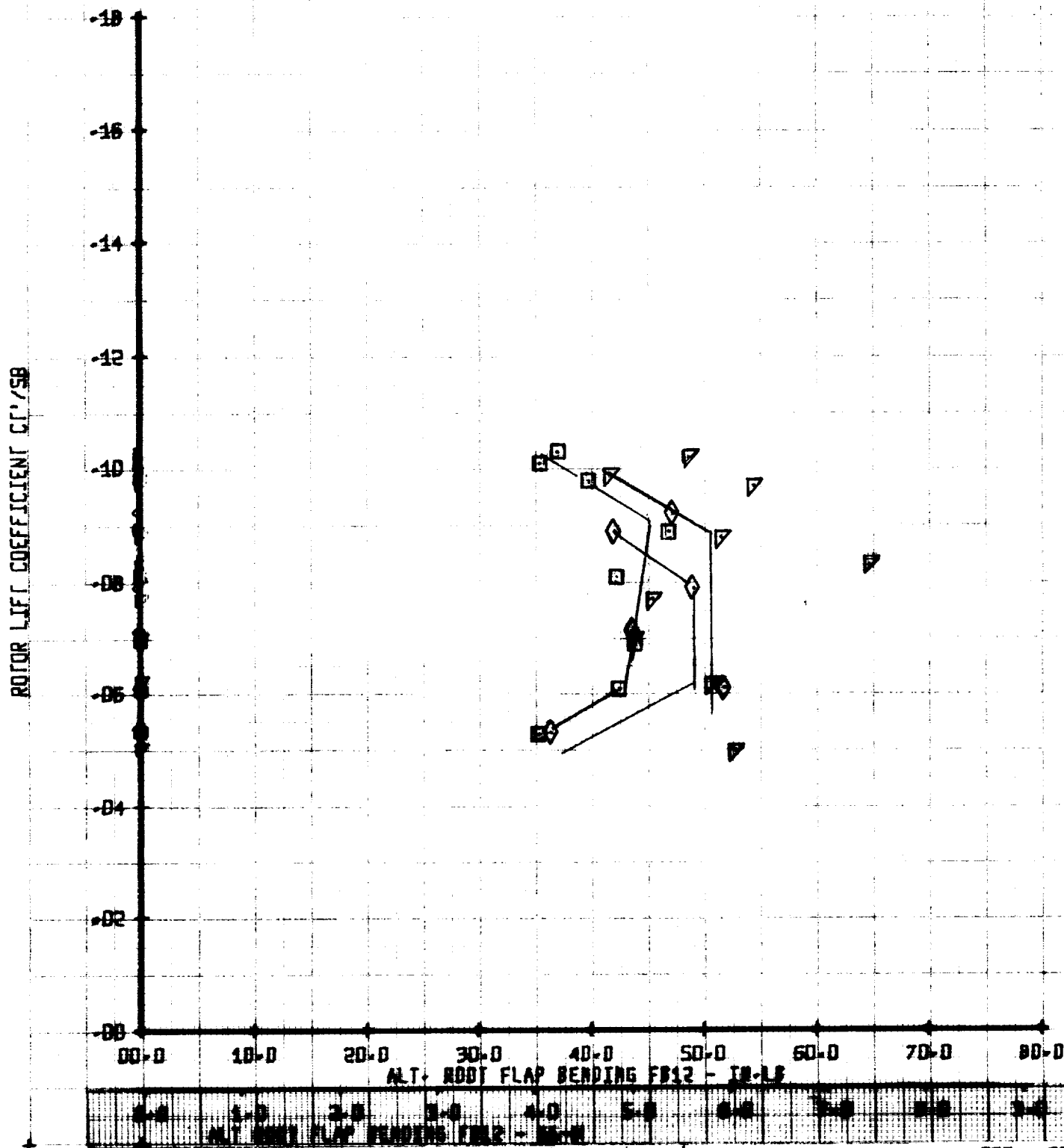


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MLP	1/00258	VTUN
□	225	.50	.05	310
▽	251	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

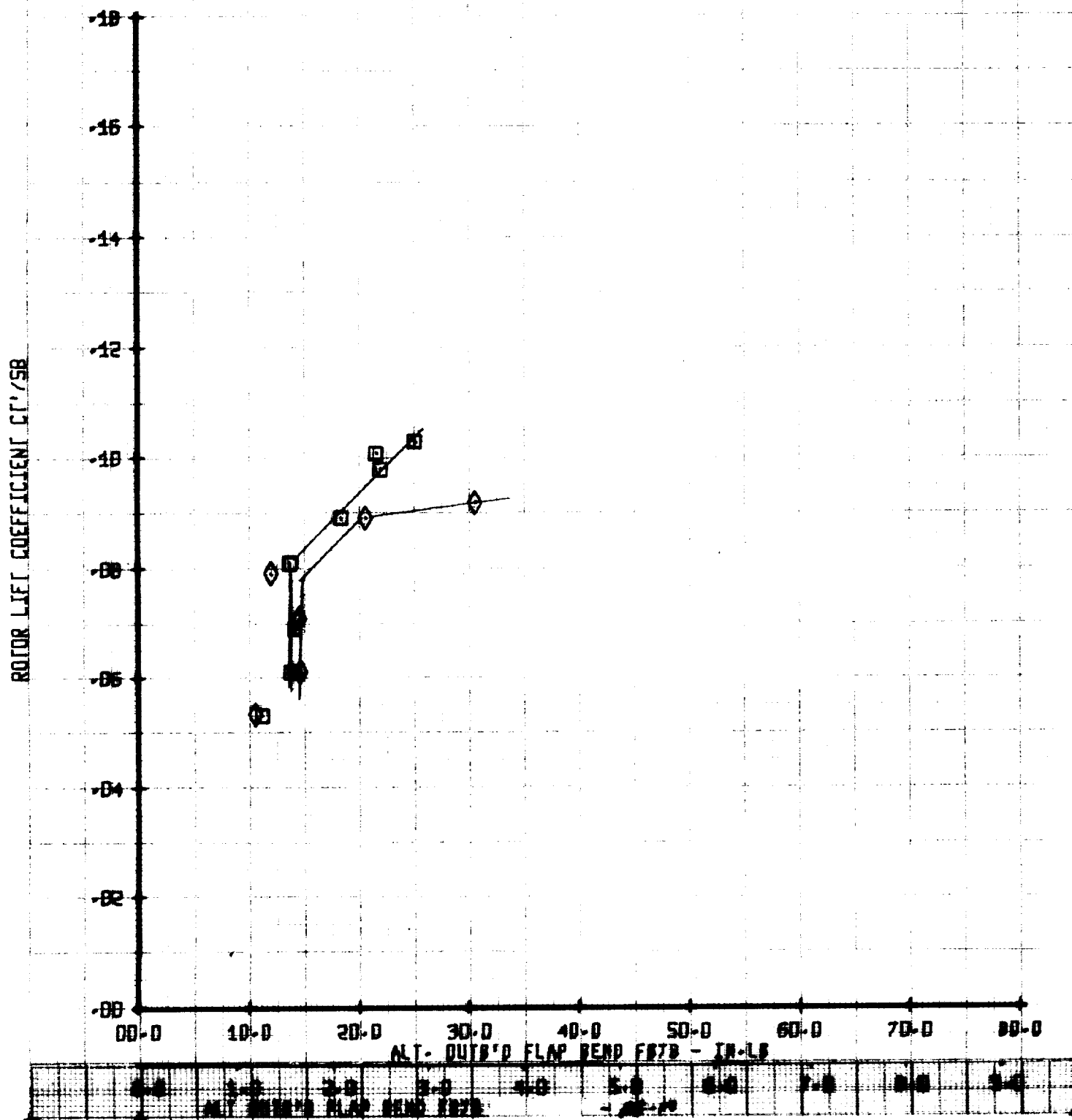


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/002SB	VTUN
□	225	.50	.05	310
△	251	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD FLAP BENDING FB78



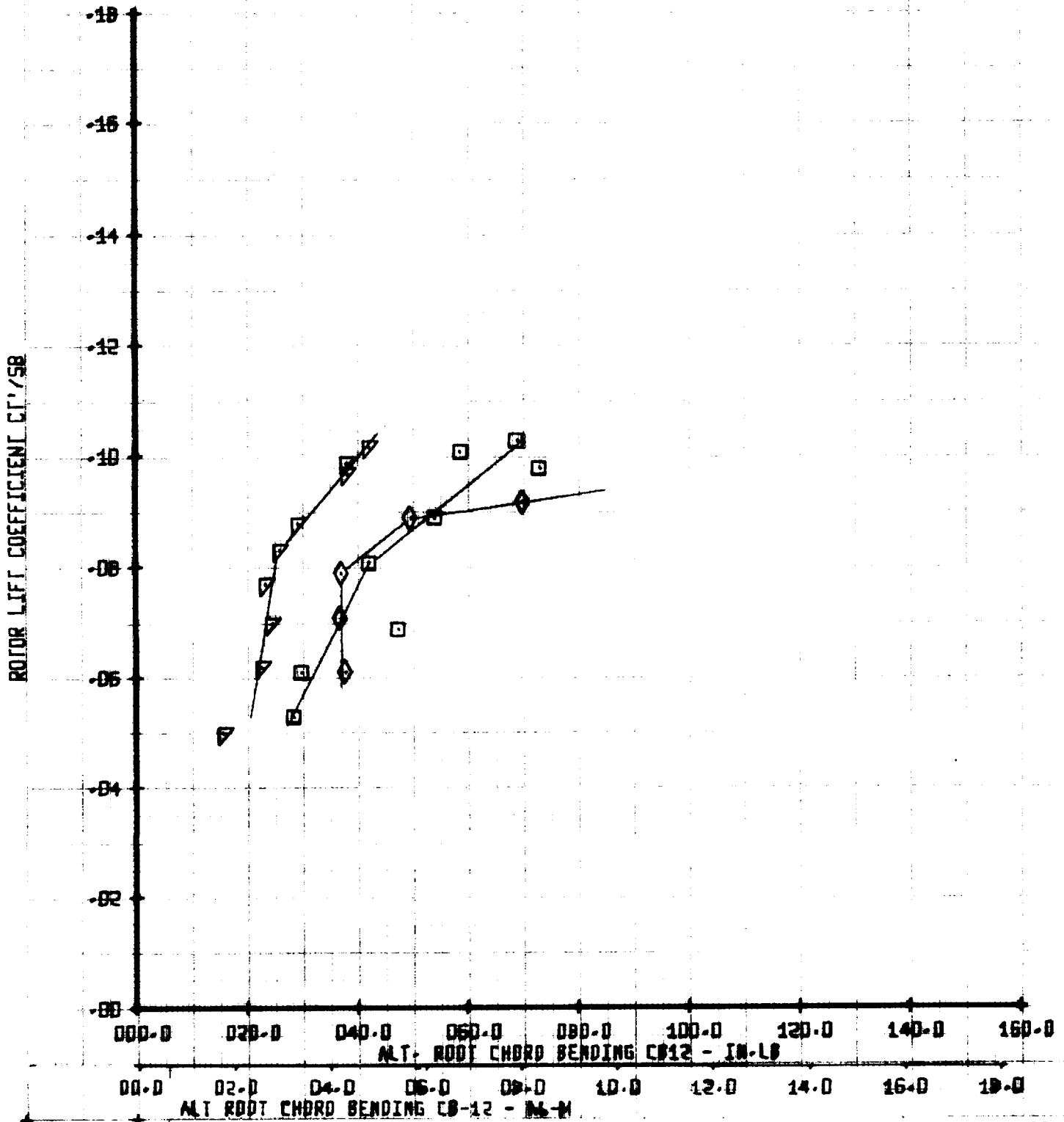
SET 36
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	1/00298	YTLN
□	225	.50	.05	310
▽	261	.50	.05	310
◇	226	.50	.10	310

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

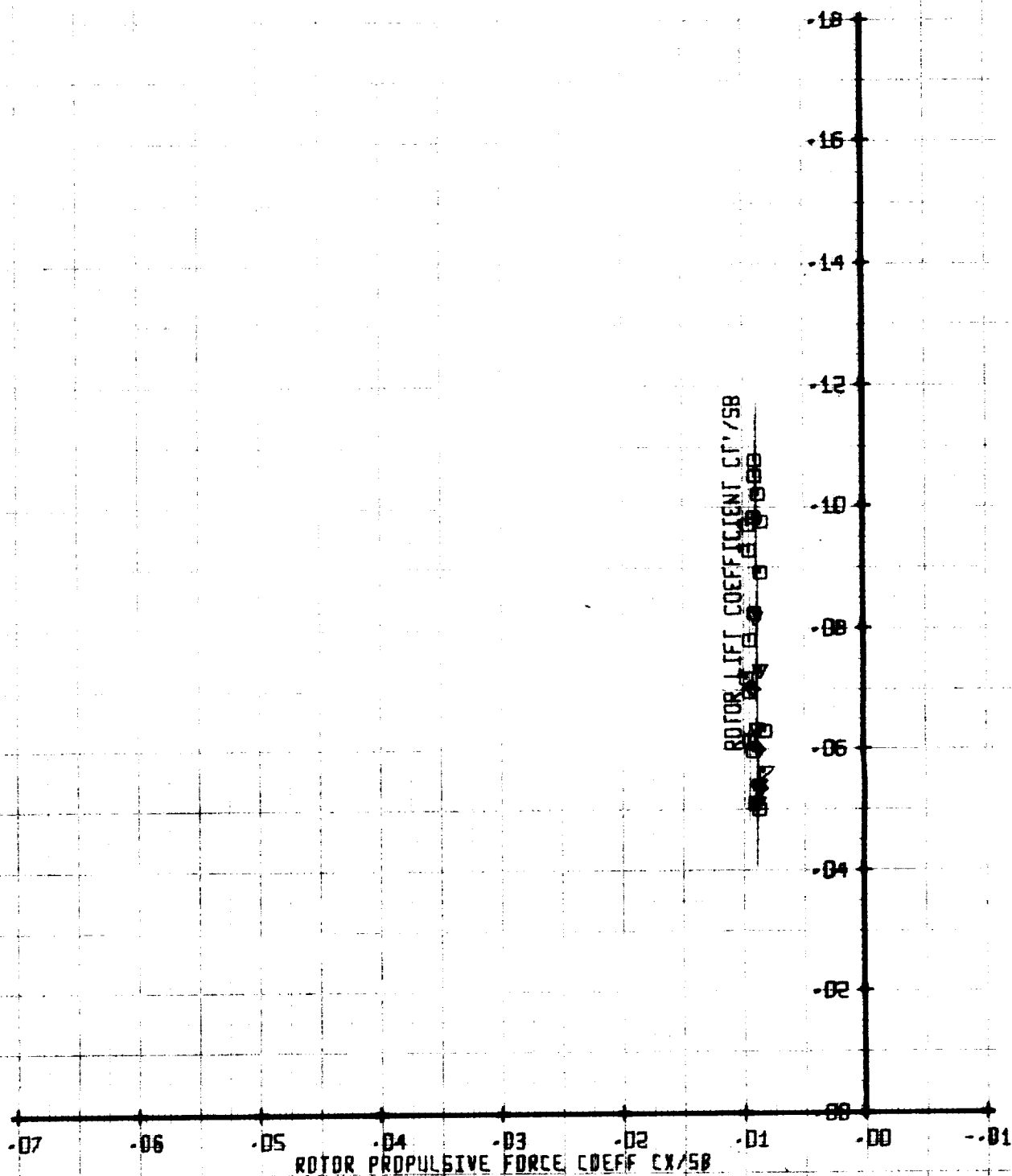


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	224	.53	.05	328
△	220	.53	.05	328
◇	221	.53	.05	328
▽	222	.53	.05	328

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PROPULSIVE FORCE COEFFICIENT

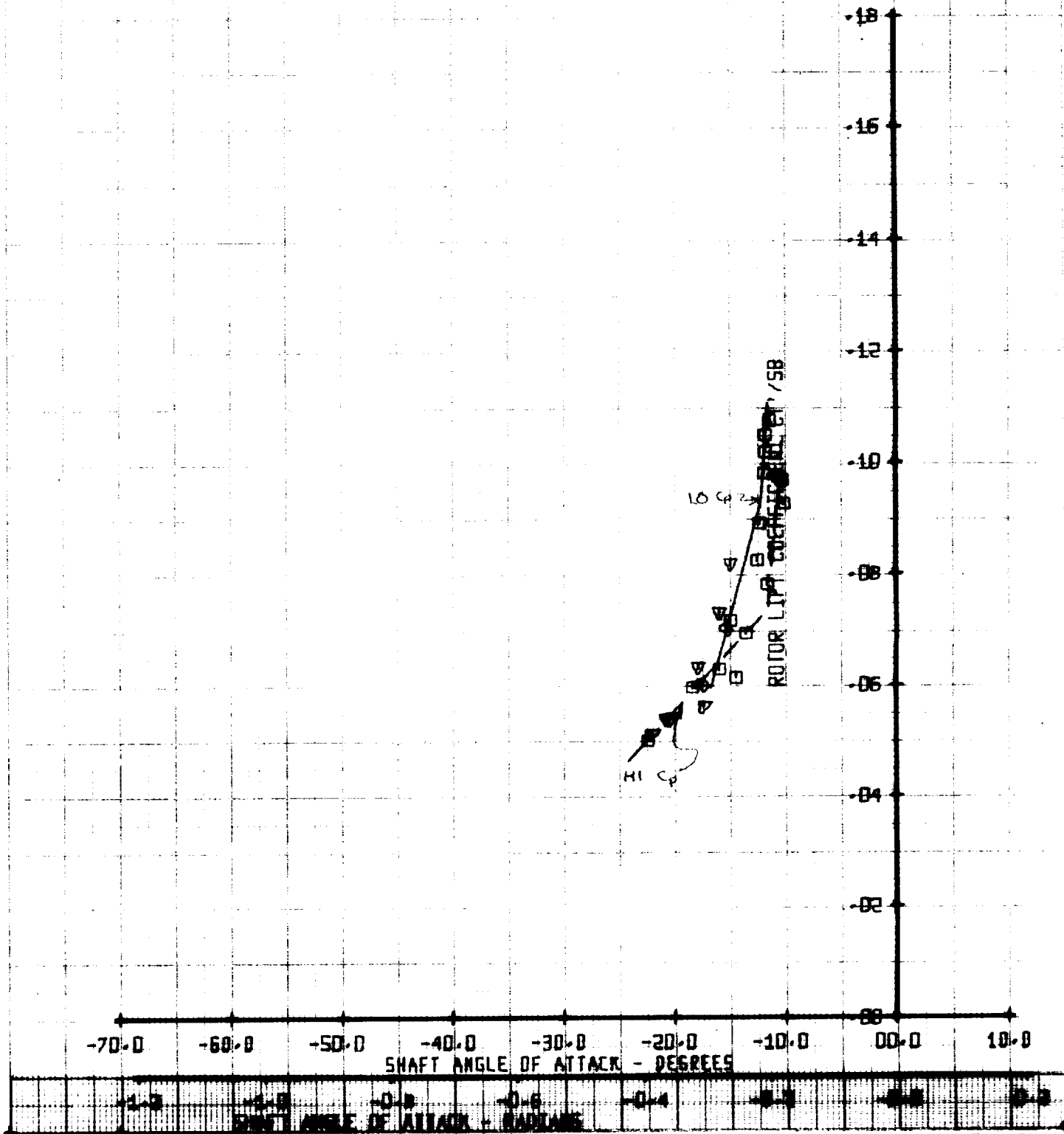


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	224	.53	.05	328
▽	220	.53	.05	328
◇	221	.53	.05	328
▽	222	.53	.05	328

ROTOR LIFT COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK



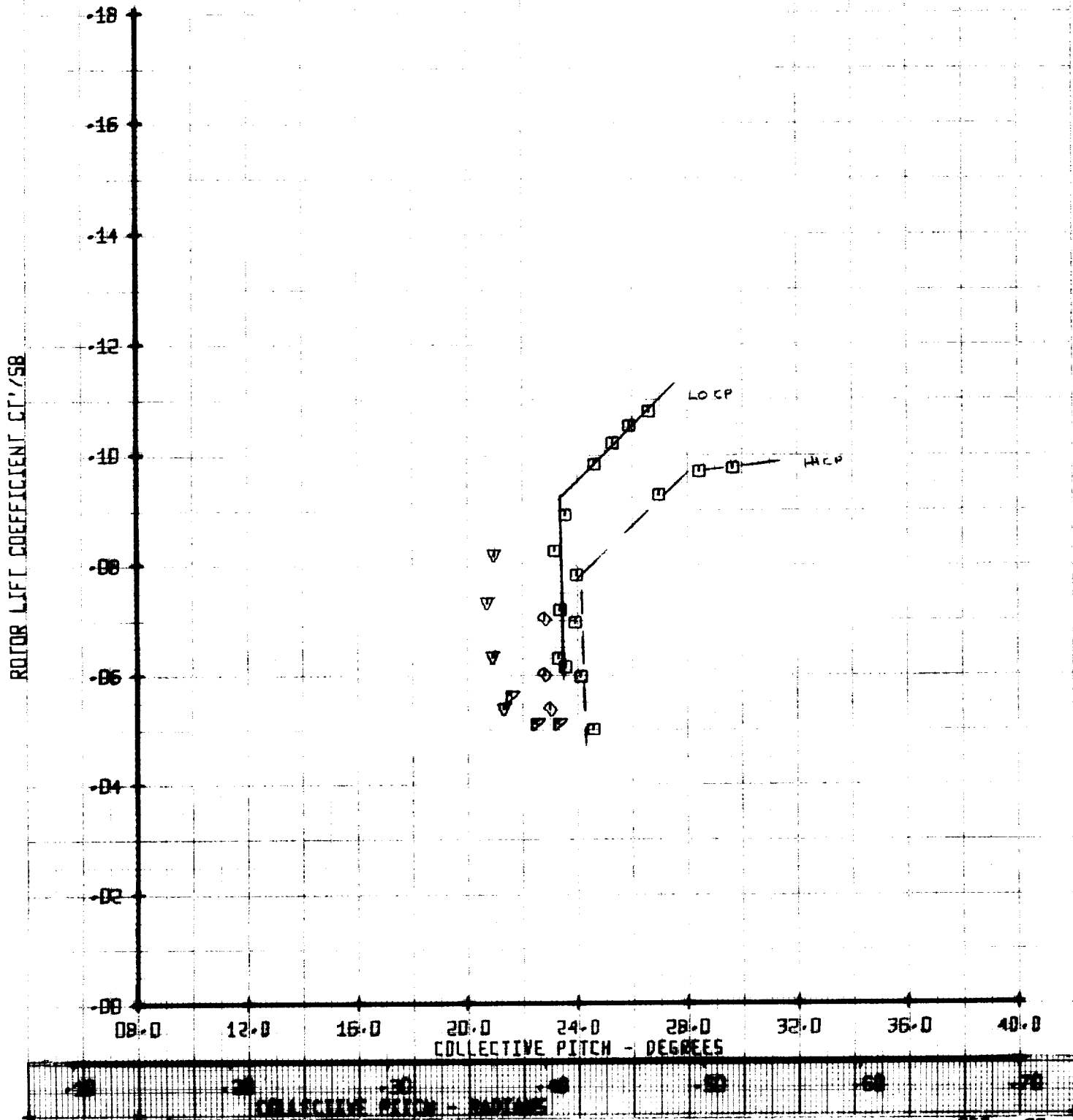
SET 37
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/DD2SB	VTIN
□	224	.53	.05	328
▧	220	.53	.05	328
◊	221	.53	.05	328
▽	222	.53	.05	328

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH

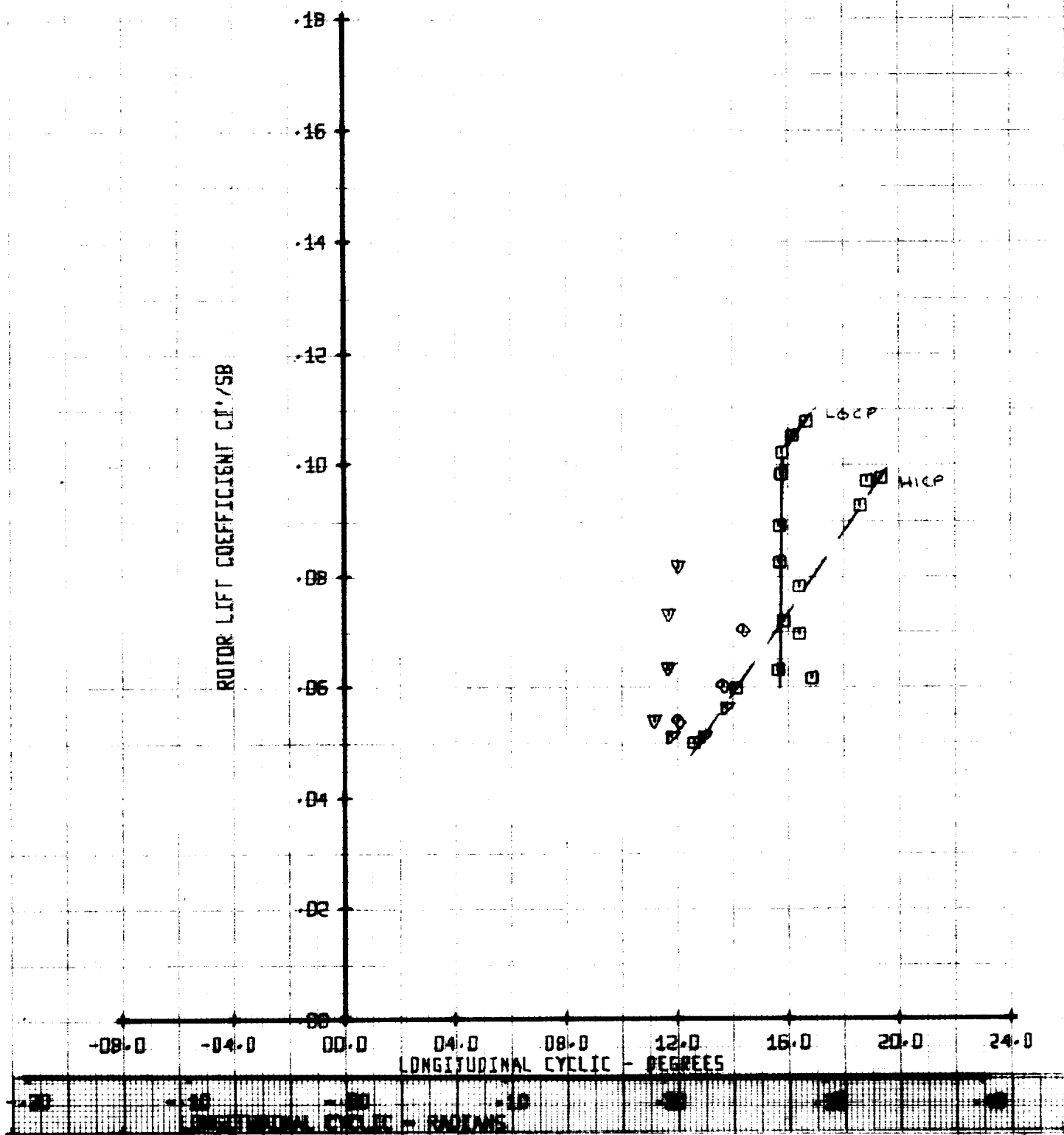


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/0025B	VTUN
□	224	.53	.05	328
◇	220	.53	.05	328
◇	221	.53	.05	328
▽	222	.53	.05	328

ROTOR LIFT COEFFICIENT
VERSUS
LONGITUDINAL CYCLIC

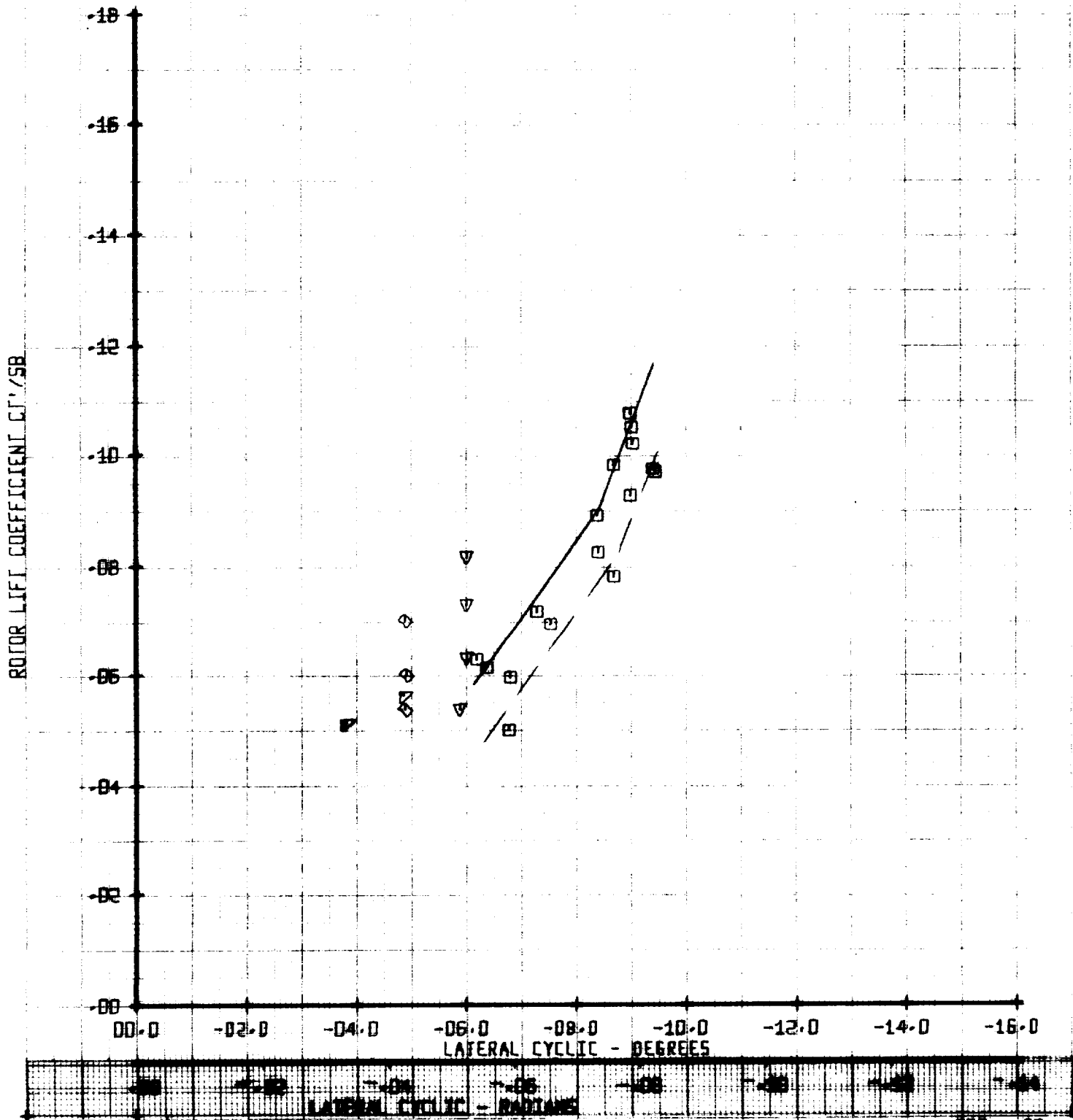


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/QD258	VTUN
□	224	.53	.05	328
▽	220	.53	.05	328
◇	221	.53	.05	328
▽	222	.53	.05	328

ROTOR LIFT COEFFICIENT
VERSUS
LATERAL CYCLIC



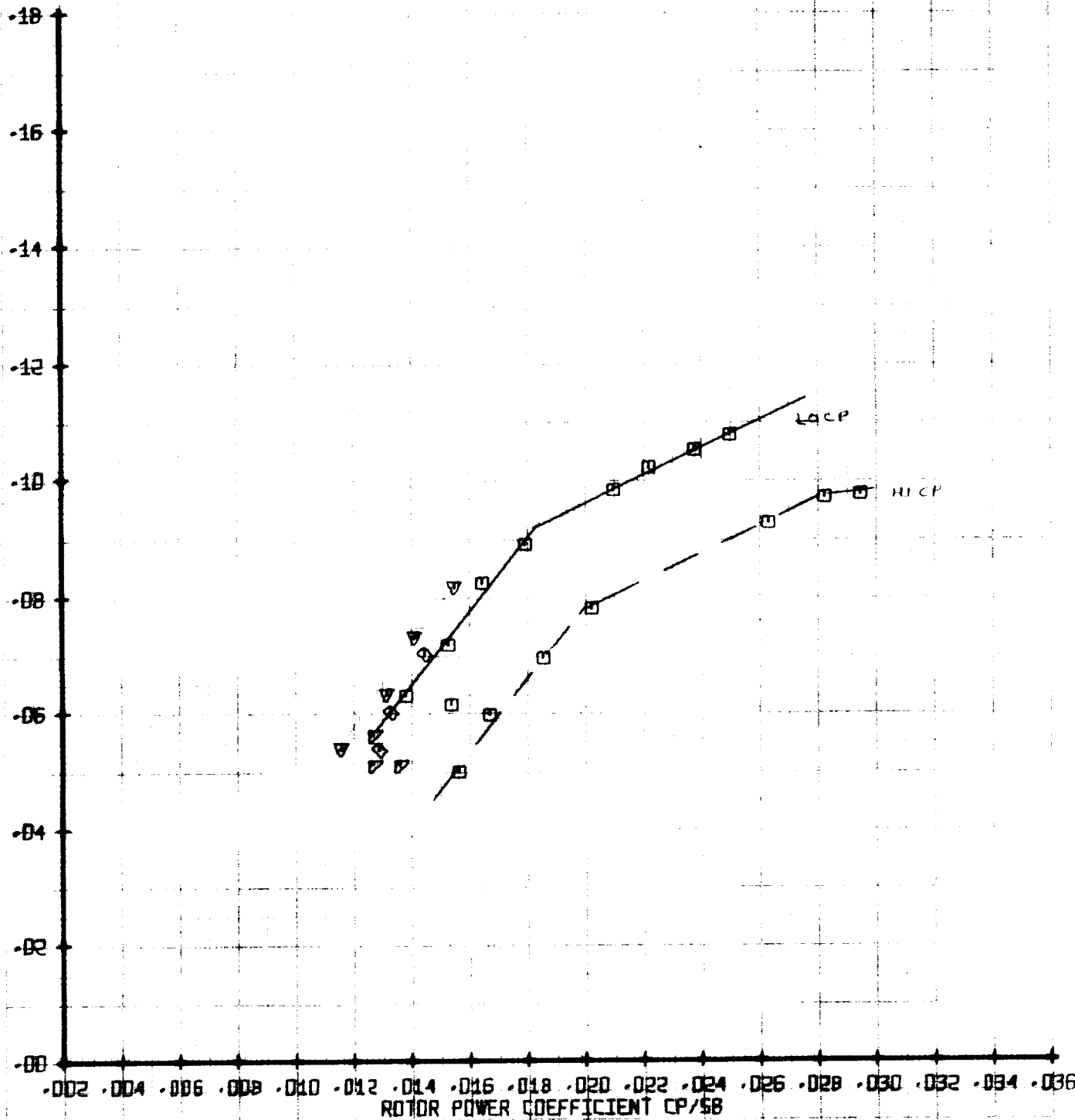
LEFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/DD2SB	YILIN
□	224	.53	.05	328
▽	220	.53	.05	328
◇	221	.53	.05	328
▽	222	.53	.05	328

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT

ROTOR LIFT COEFFICIENT CL'/SB



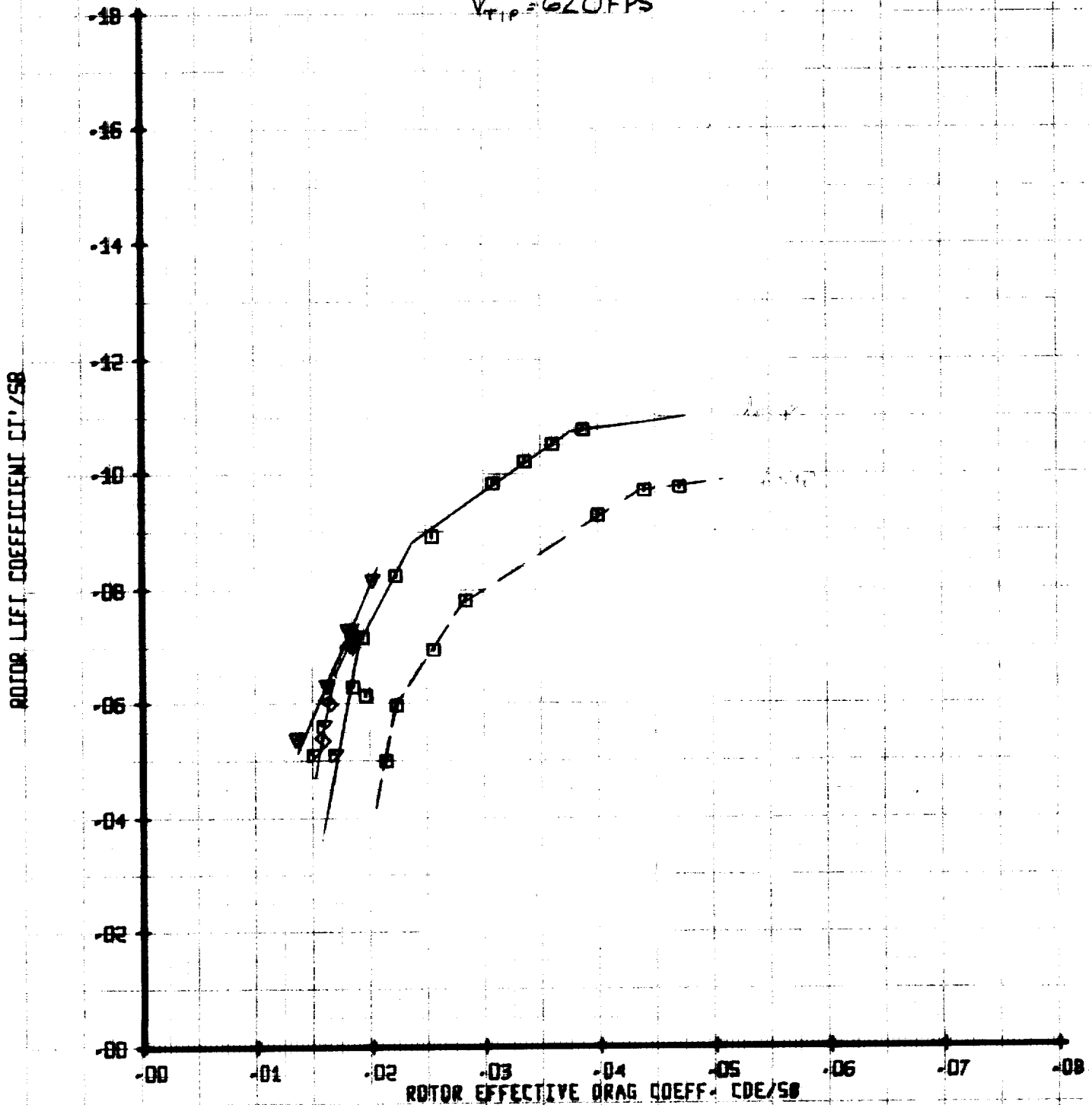
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'	X/0025M	VTUN
□	224	.53	.05	320
△	220	.53	.05	328
◆	221	.53	.05	328
▽	222	.53	.05	328

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT

$V_{tip} = 620 \text{ FPS}$

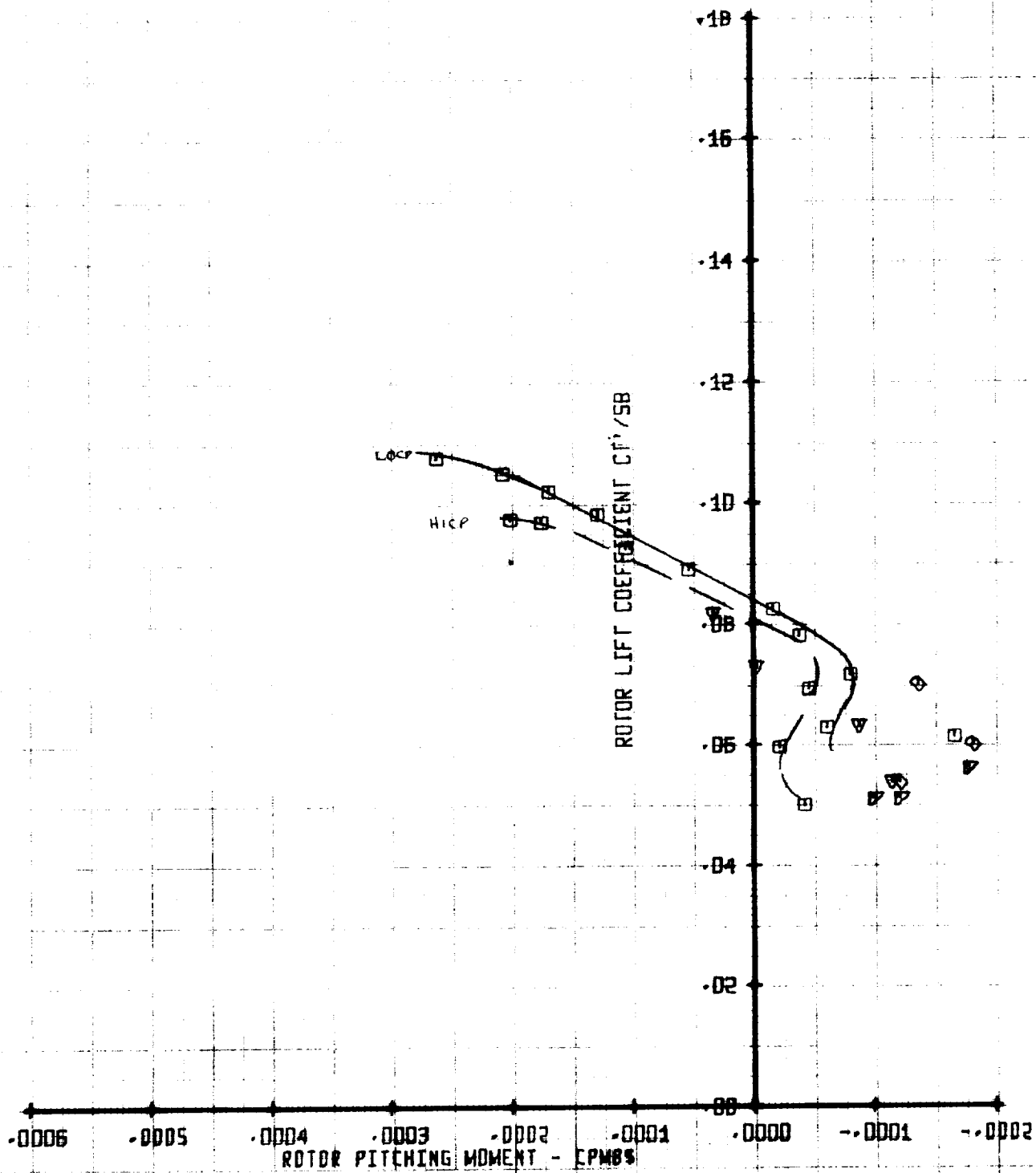


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

Figure A-211

LEGEND				
SYM	RUN	MU'	X700258	VTUN
0	224	.53	.05	328
1	220	.53	.05	328
2	221	.53	.05	328
3	222	.53	.05	328

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

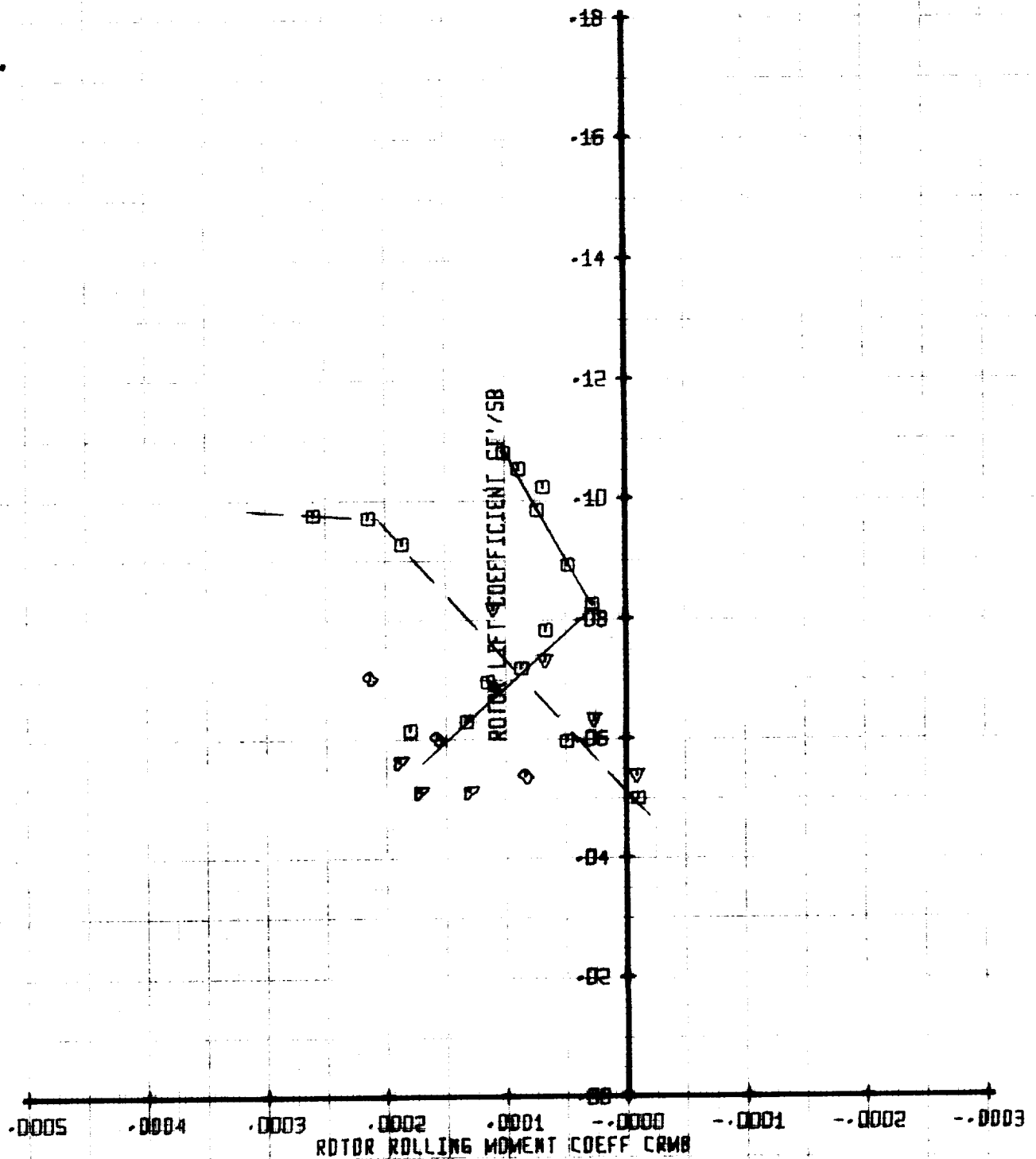


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/002SB	Y/LIN
□	224	.53	.05	328
◊	220	.53	.05	328
◇	221	.53	.05	328
▽	222	.53	.05	328

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT

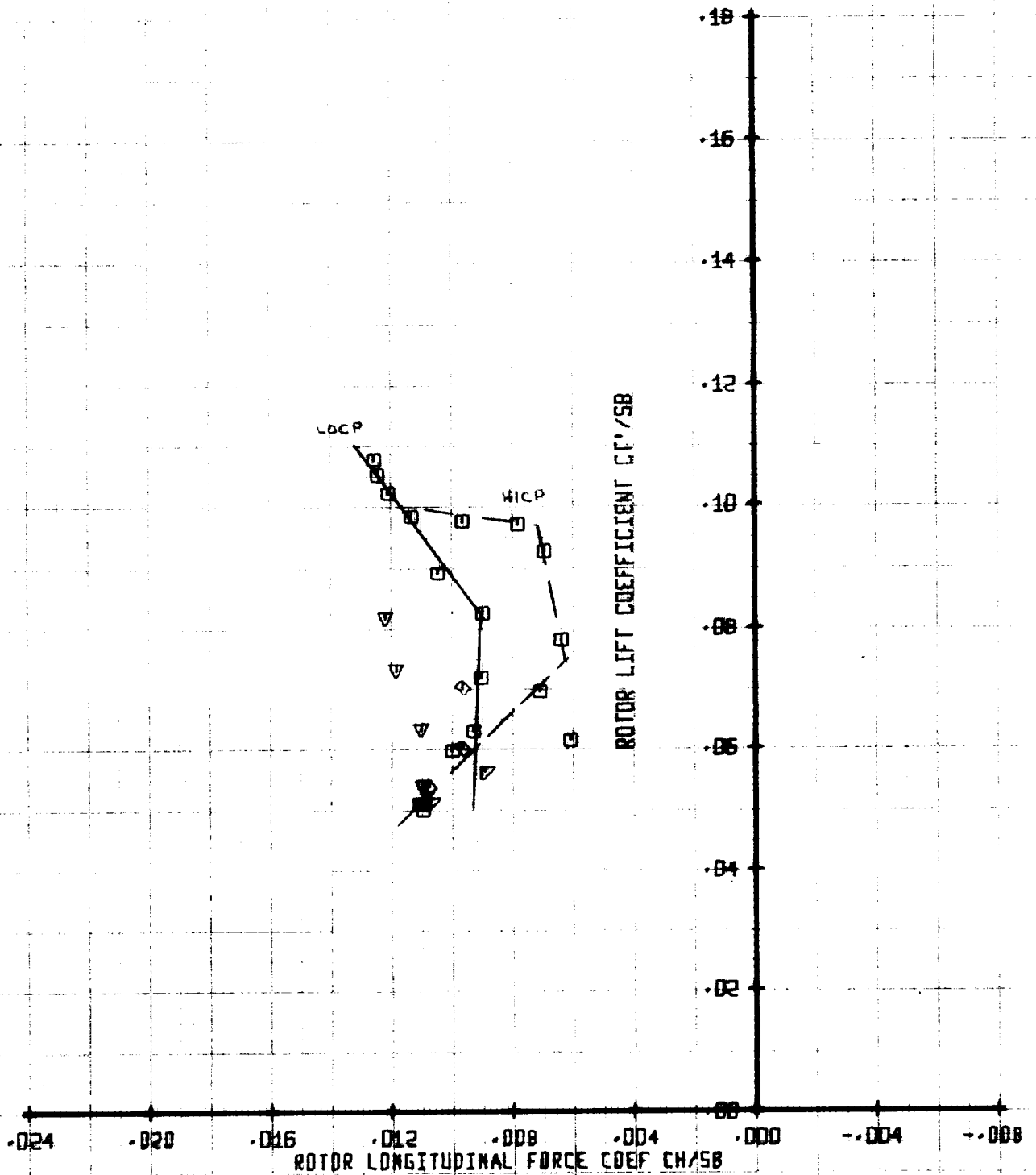


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/DD2SB	VTLN
□	224	.53	.05	328
▽	220	.53	.05	328
◇	221	.53	.05	328
▽	222	.53	.05	328

ROTOR LIFT COEFFICIENT
 VERSUS
 ROTOR LONGITUDINAL FORCE COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/DD2SB	YTLN
□	224	.53	.05	328
△	220	.53	.05	328
◇	221	.53	.05	328
▽	222	.53	.05	328

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT

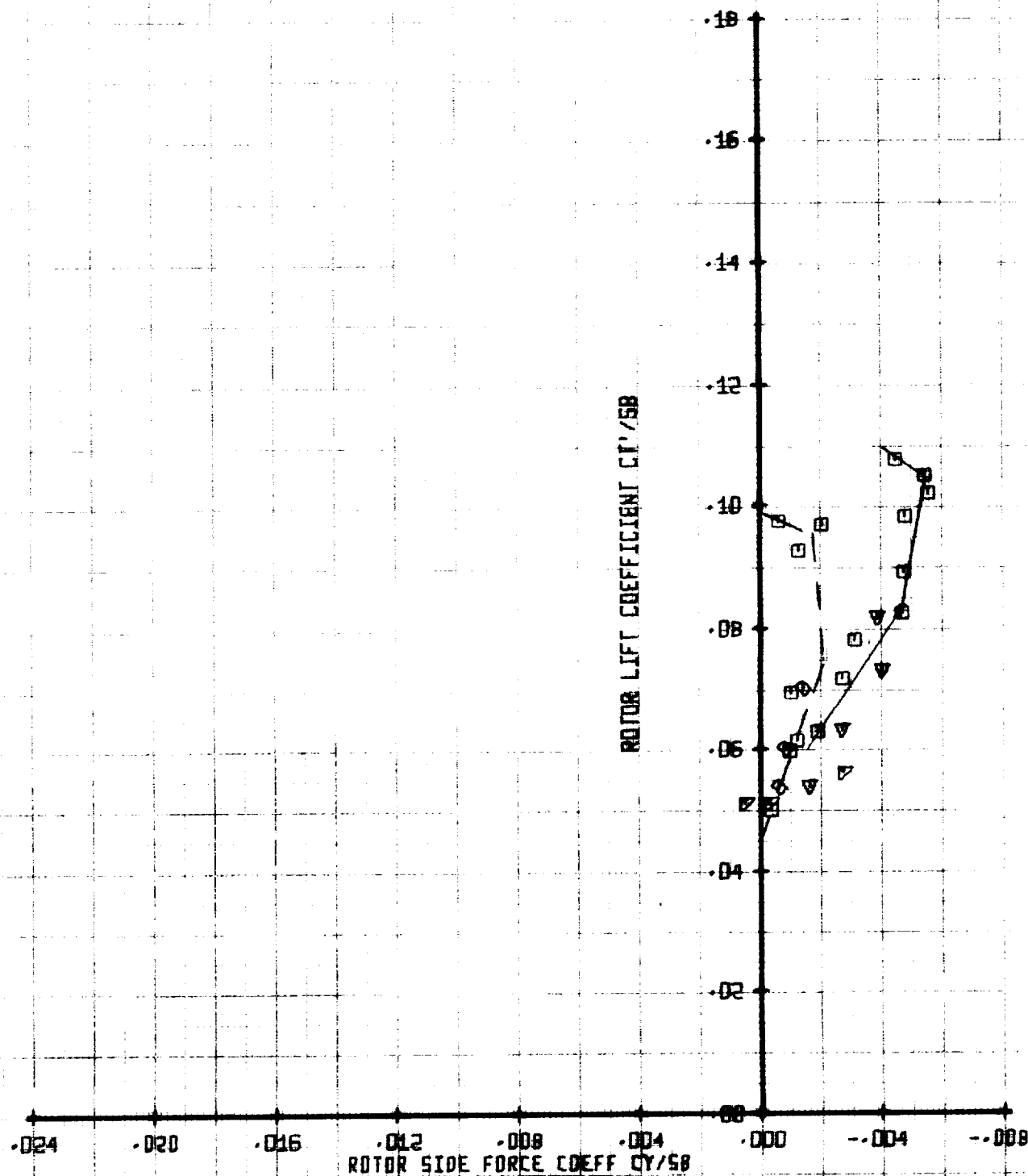


Figure A-215

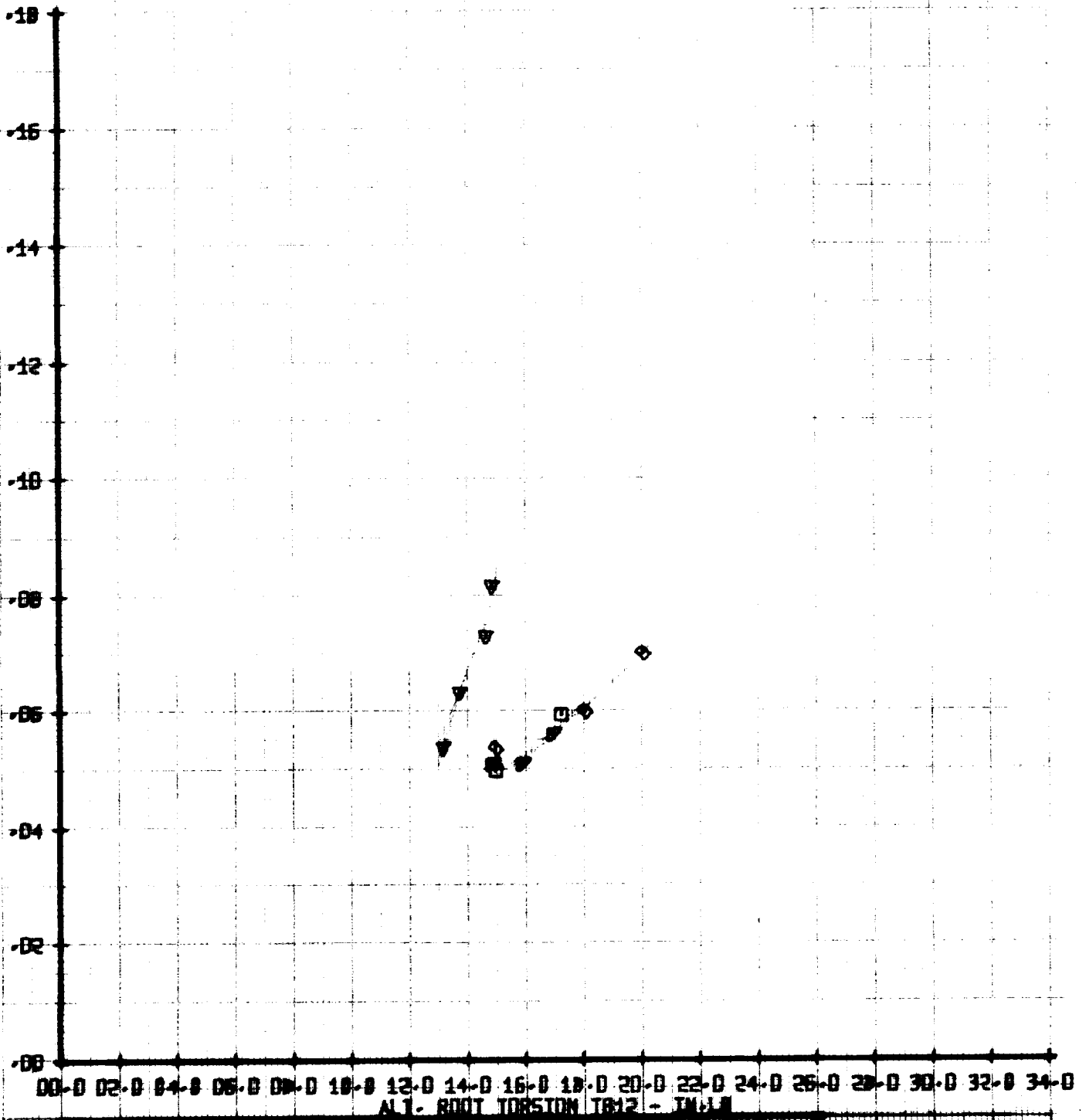
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	224	.53	.05	320
○	220	.53	.05	320
△	221	.53	.05	320
▽	222	.53	.05	320

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

ROTOR LIFT COEFFICIENT : $C_L' / 58$

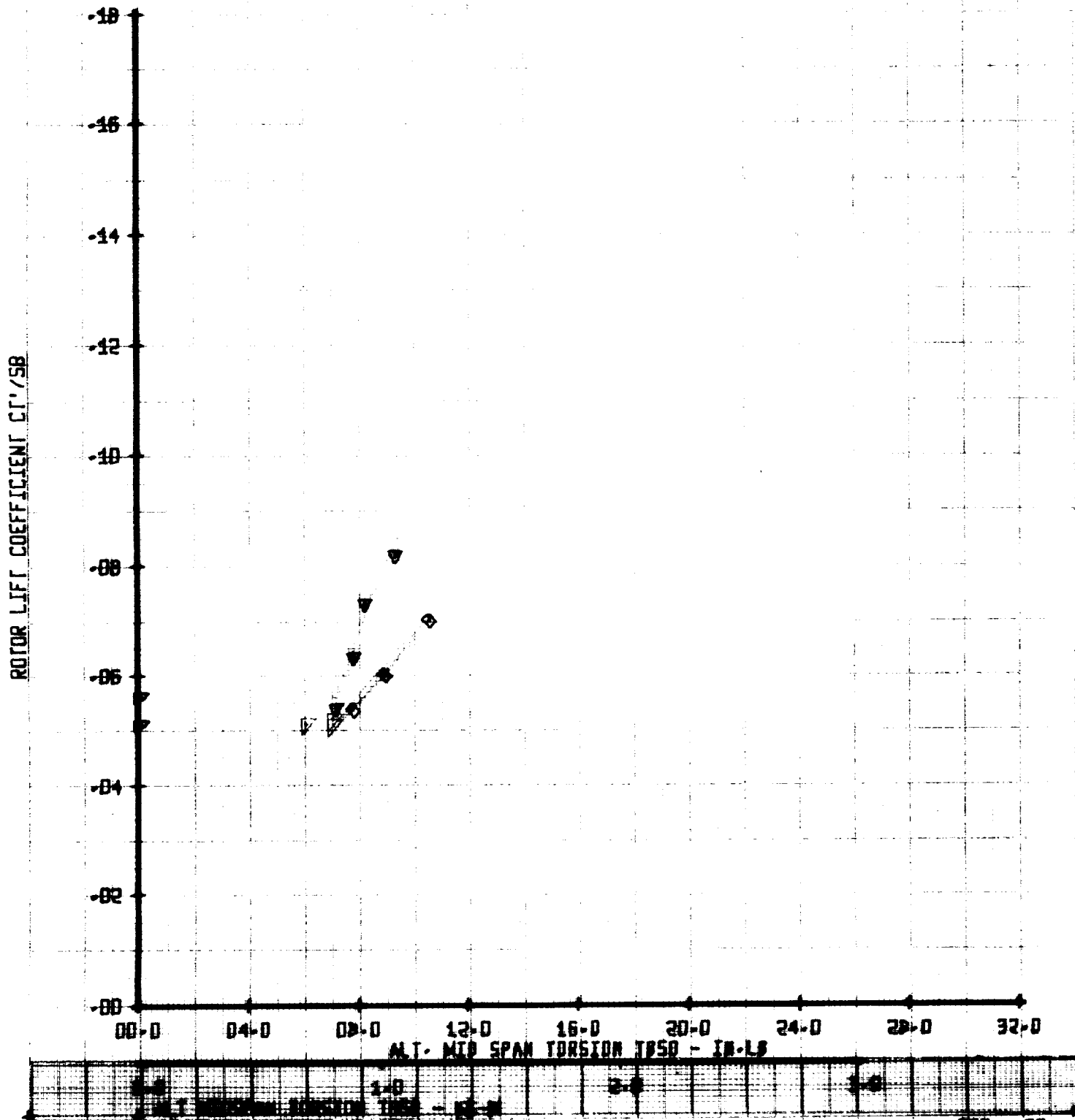


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MLP	X/00258	VTUN
○	224	.53	.05	320
△	220	.53	.05	320
◆	221	.53	.05	320
▼	222	.53	.05	320

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50



SET 37
BVWT 193

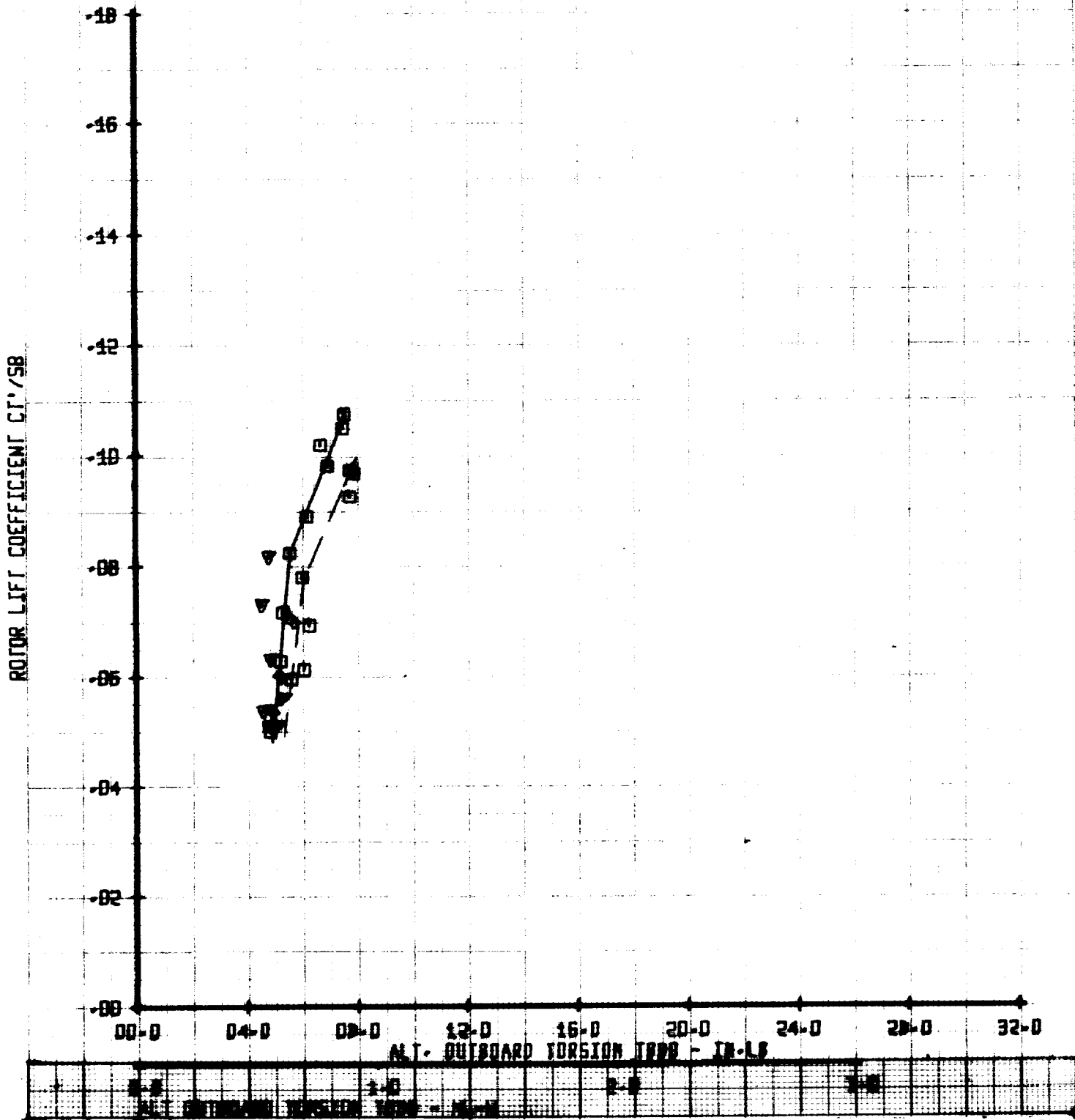
Figure A-217

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTUM
○	224	.53	.05	328
□	220	.53	.05	328
△	221	.53	.05	328
▽	222	.53	.05	328

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB80



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'	X/DB2SB	VTUN
□	224	.53	.05	320
▽	220	.53	.05	320
◆	221	.53	.05	320
▼	222	.53	.05	320

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

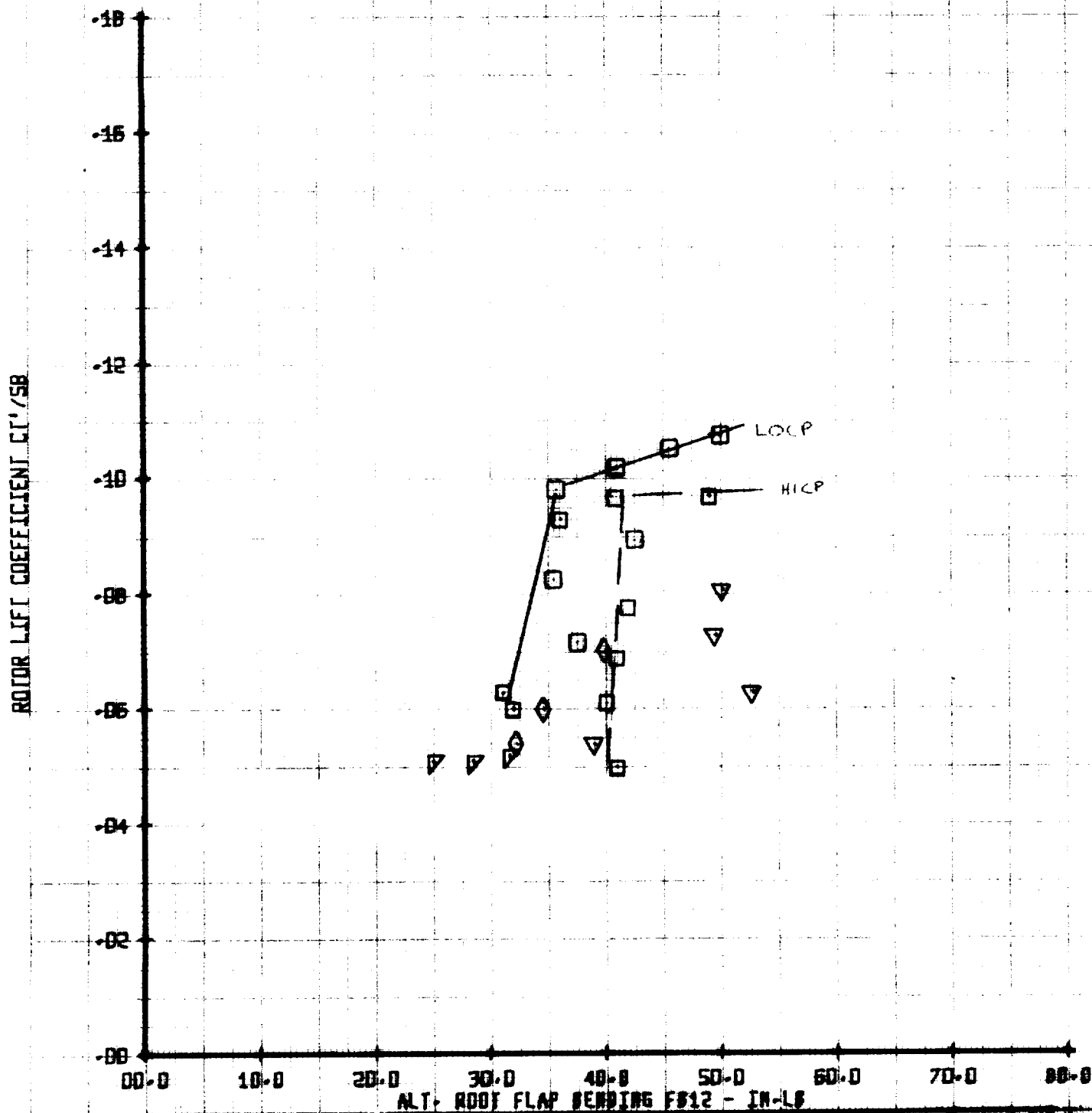


Figure A-219

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	YTUN
□	224	.53	.05	320
△	220	.53	.05	320
◆	221	.53	.05	320
▼	222	.53	.05	320

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN FLAP BENDING FB4

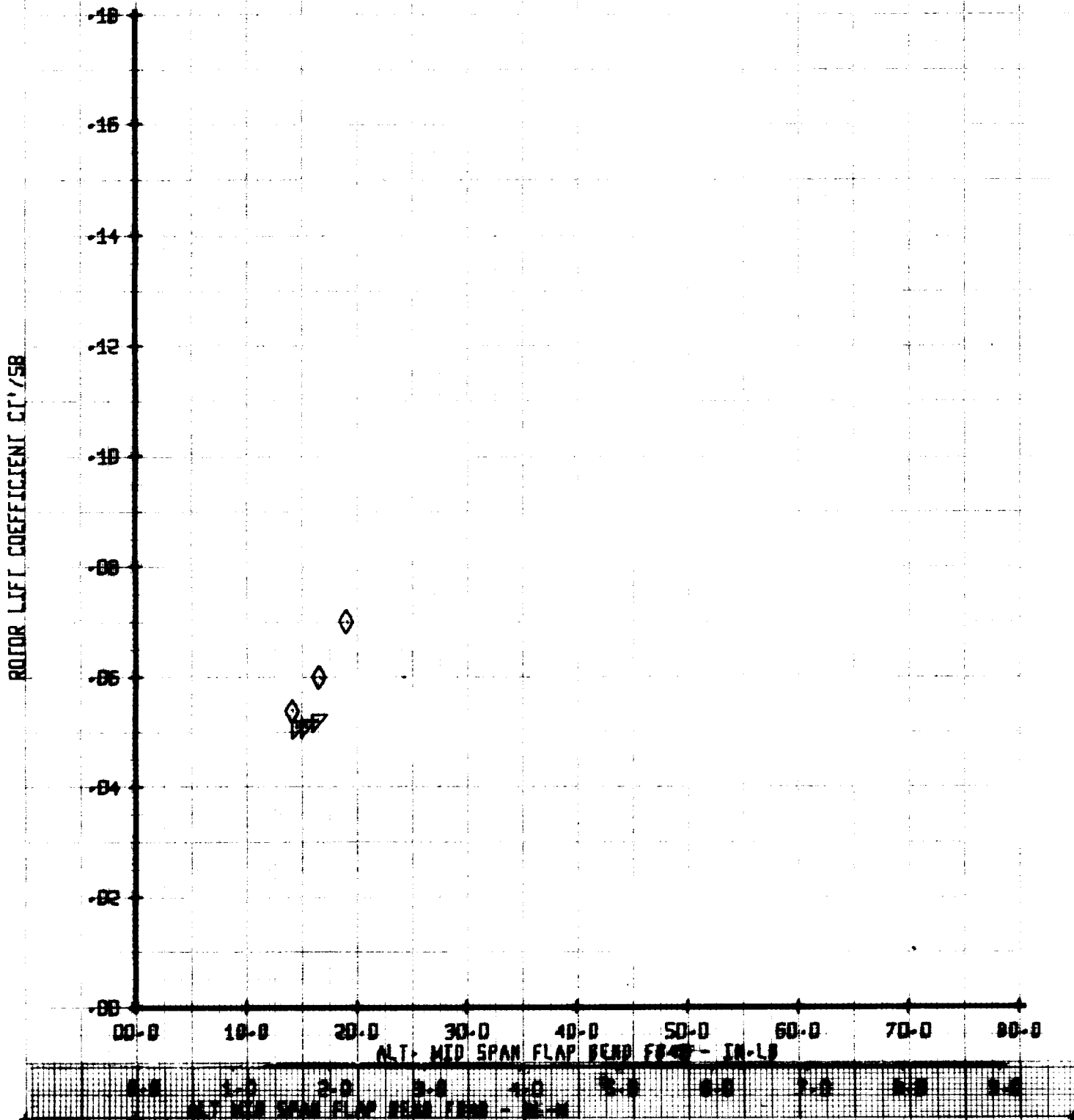


Figure A-220

LIFT-PROPULSIVE FORCE LIMIT TEST

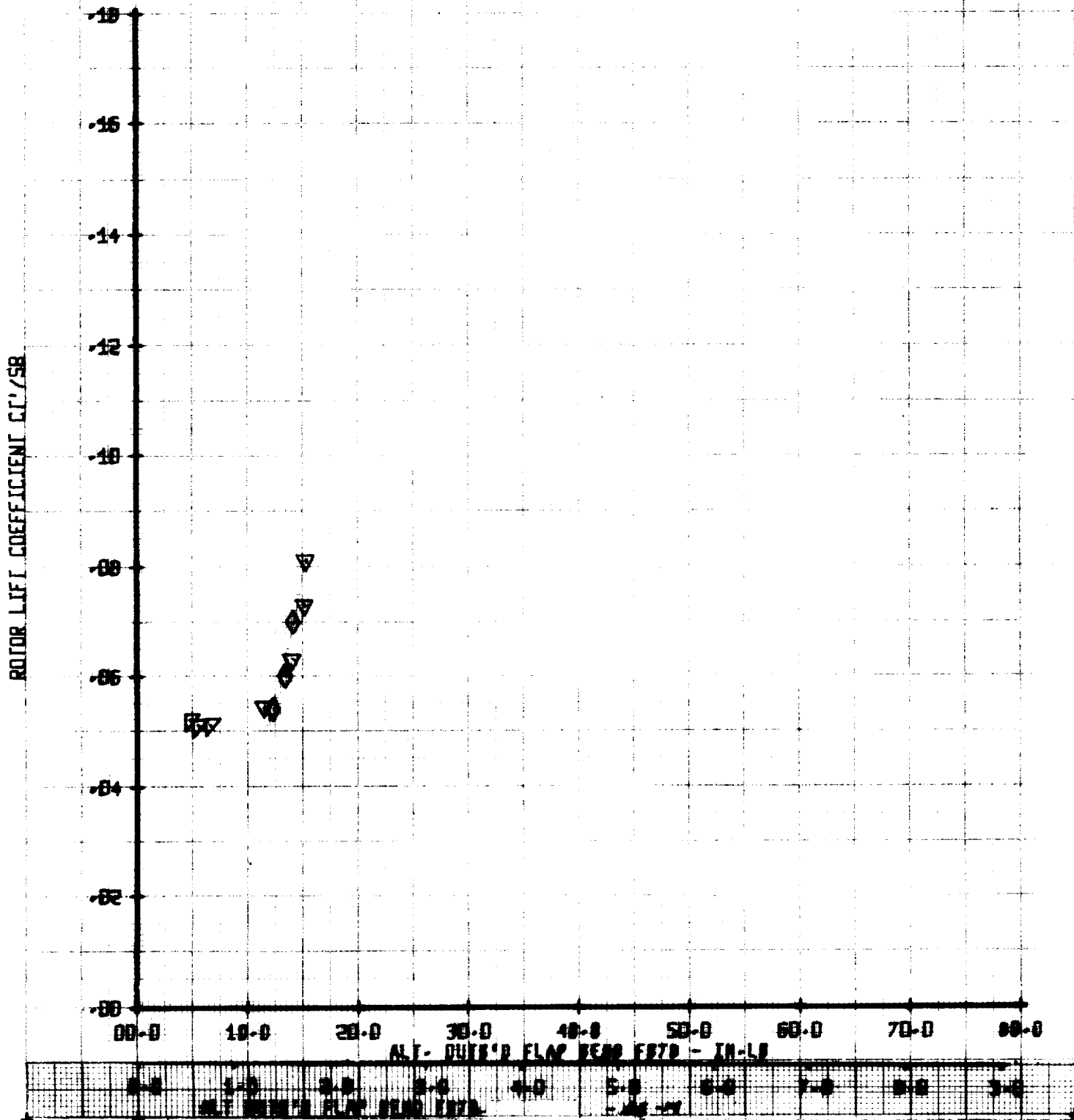
1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	YTUN
□	224	.53	.05	320
△	220	.53	.05	320
◆	221	.53	.05	320
▼	222	.53	.05	320

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD FLAP BENDING FB78

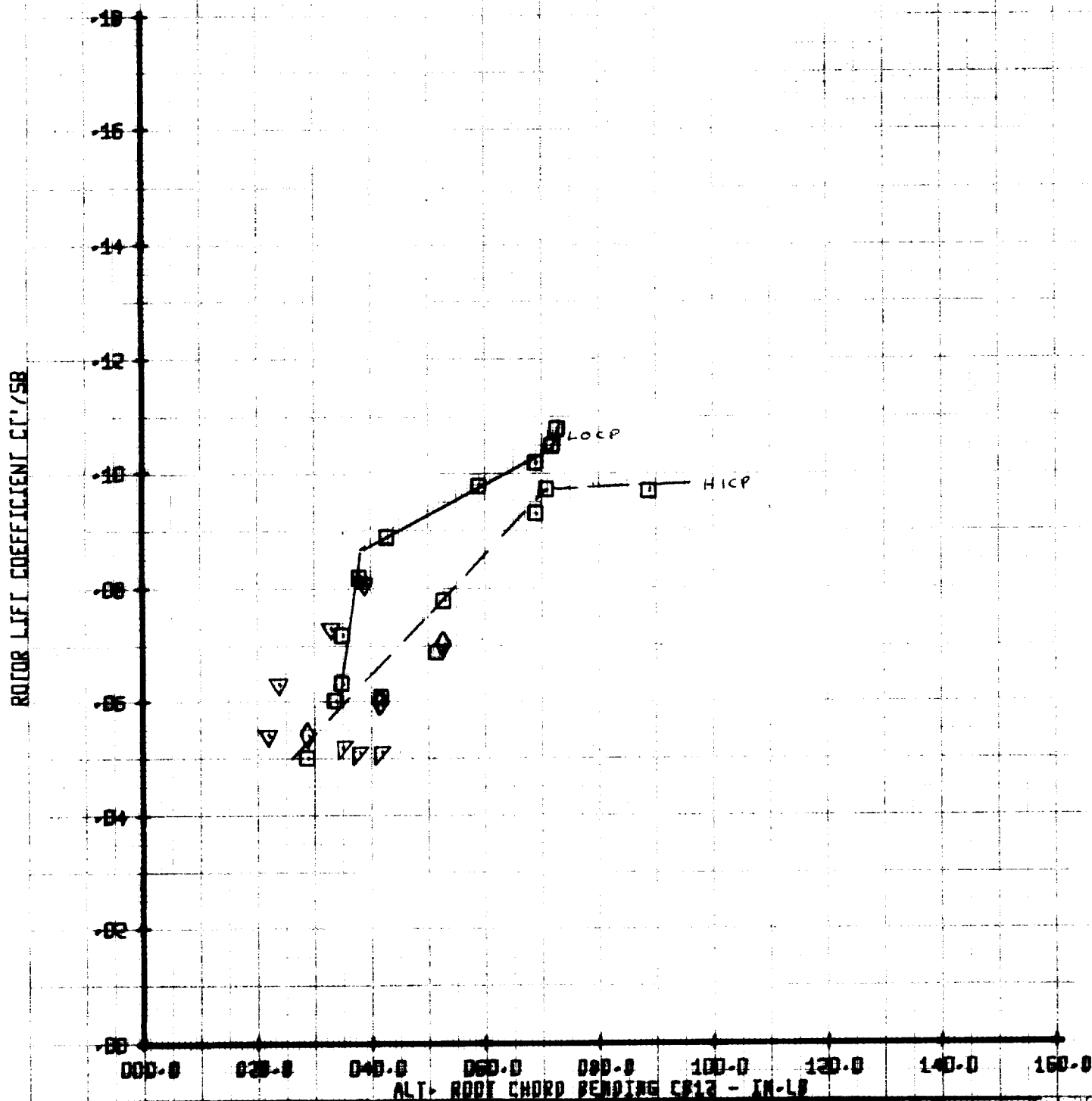


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SIM	RUN	ML'	X/D0258	Y/DIN
□	224	.53	.05	320
◇	220	.53	.05	320
△	221	.53	.05	320
▽	222	.53	.05	320

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12



LIFT-PROPULSIVE FORCE LIMIT TEST

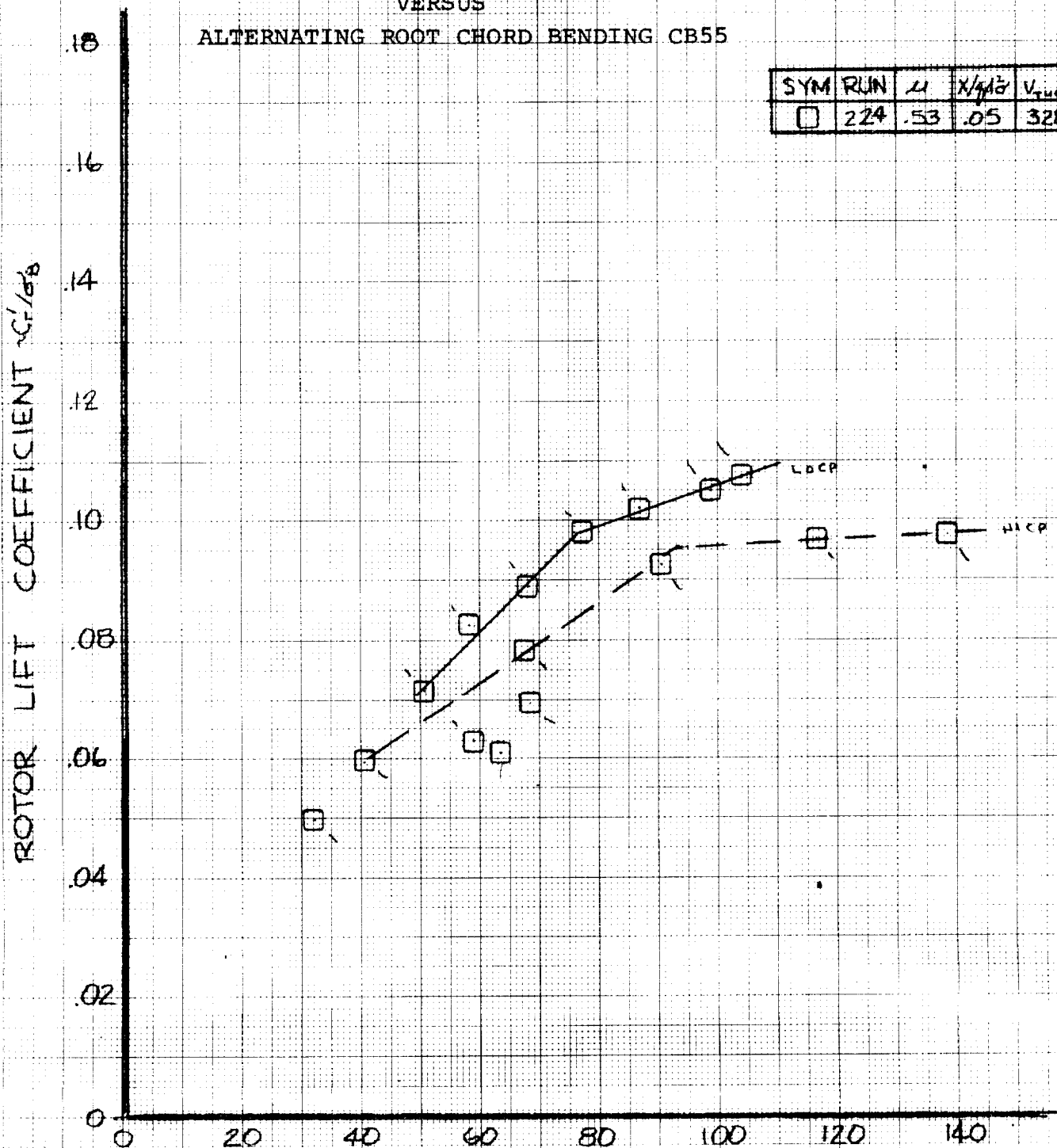
1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

ROTOR LIFT COEFFICIENT
VERSUS

ALTERNATING ROOT CHORD BENDING CB55

SYM	RUN	LI	X/418	V _{run}
□	224	.53	.05	328



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MILLIMETER

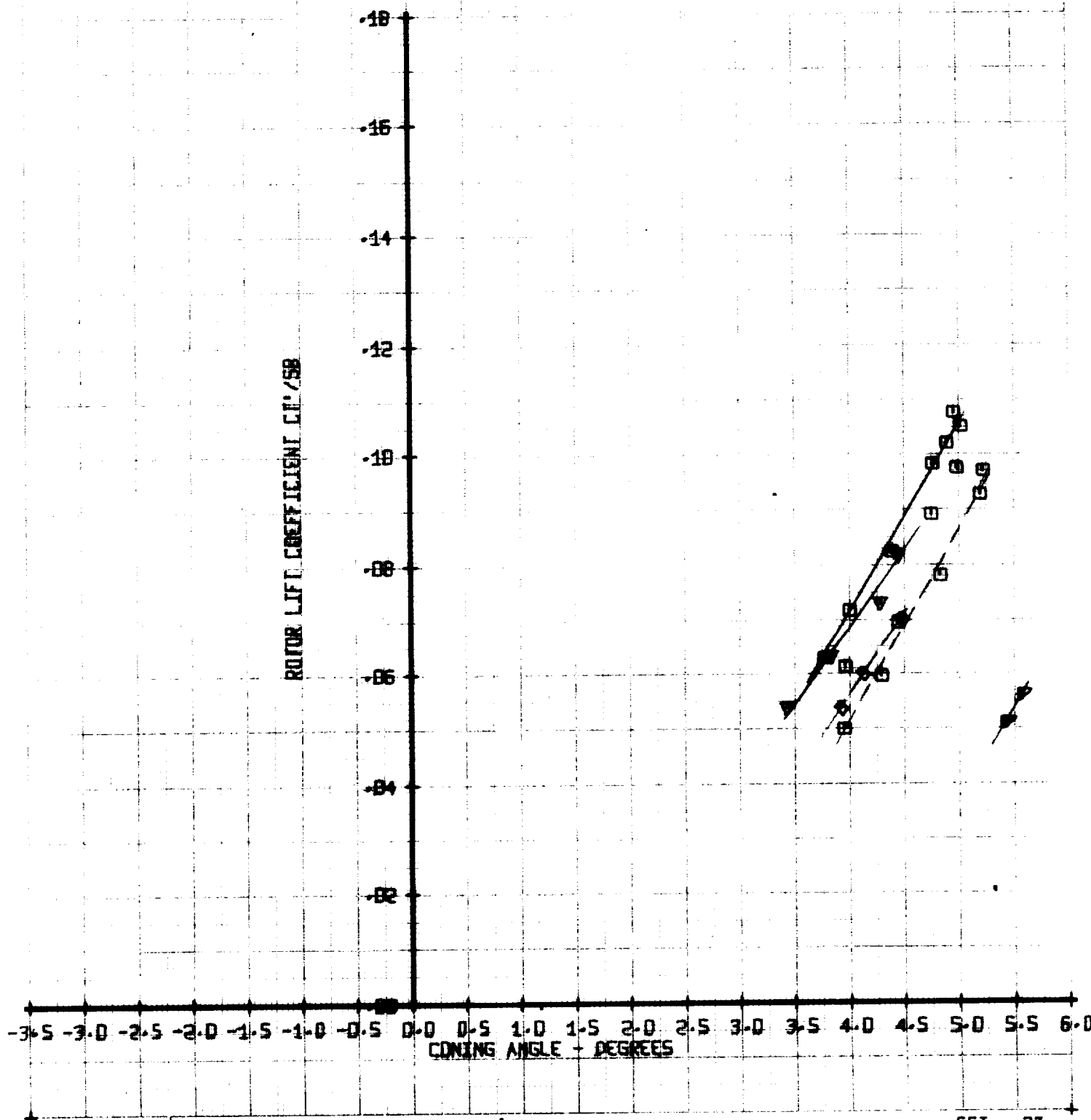
00-0	02-0	04-0	06-0	08-0	10-0	12-0	14-0	16-0	18-0
ALT MID SPAN CHORD CB55 - AL-M									

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	YTUN
□	224	.53	.05	320
△	220	.53	.05	320
◆	221	.53	.05	320
▲	222	.53	.05	320

ROTOR LIFT COEFFICIENT
VERSUS
CONING ANGLE

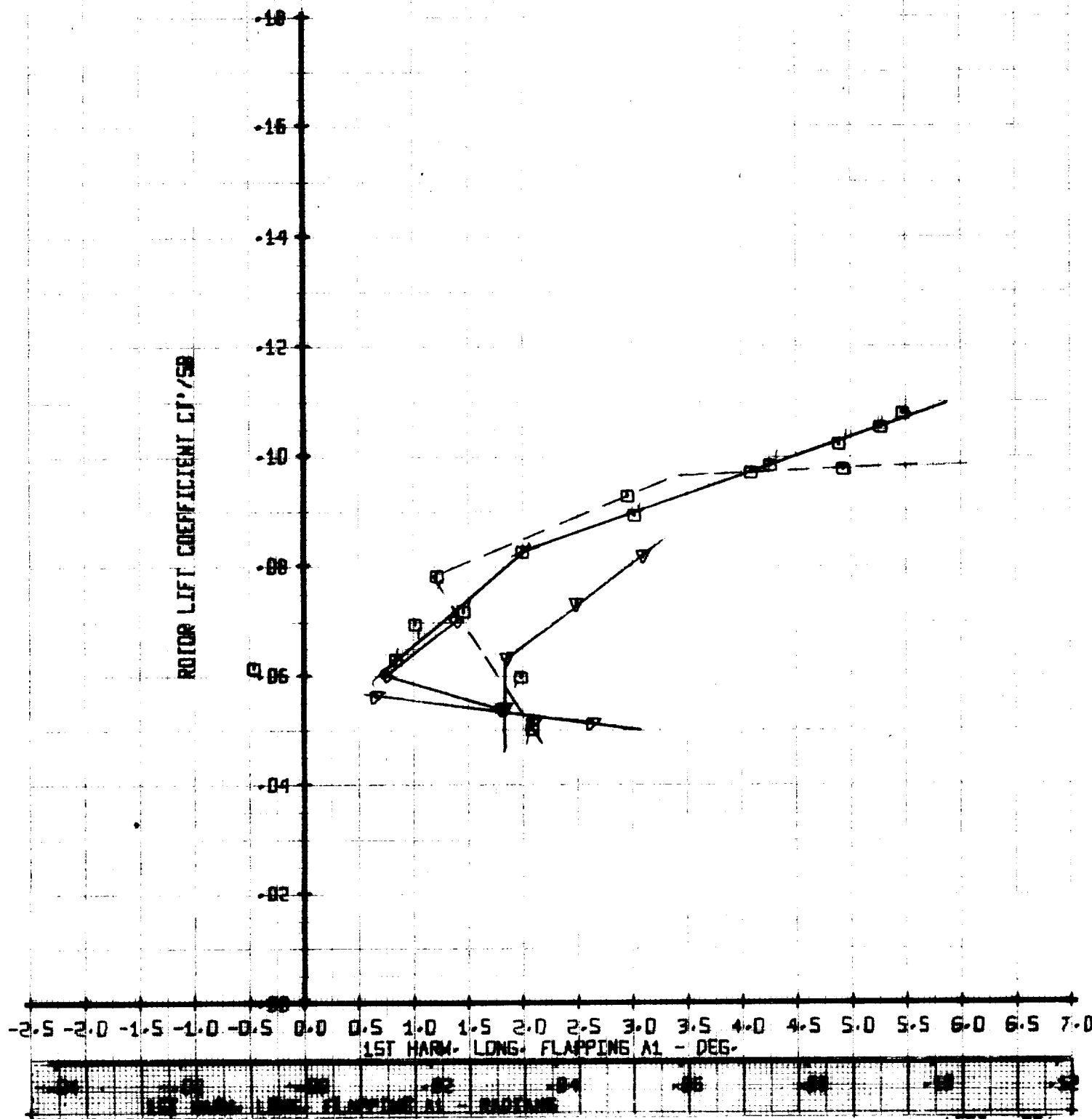


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	YTLN
□	224	.53	.05	328
△	220	.53	.05	328
◇	221	.53	.05	328
▽	222	.53	.05	328

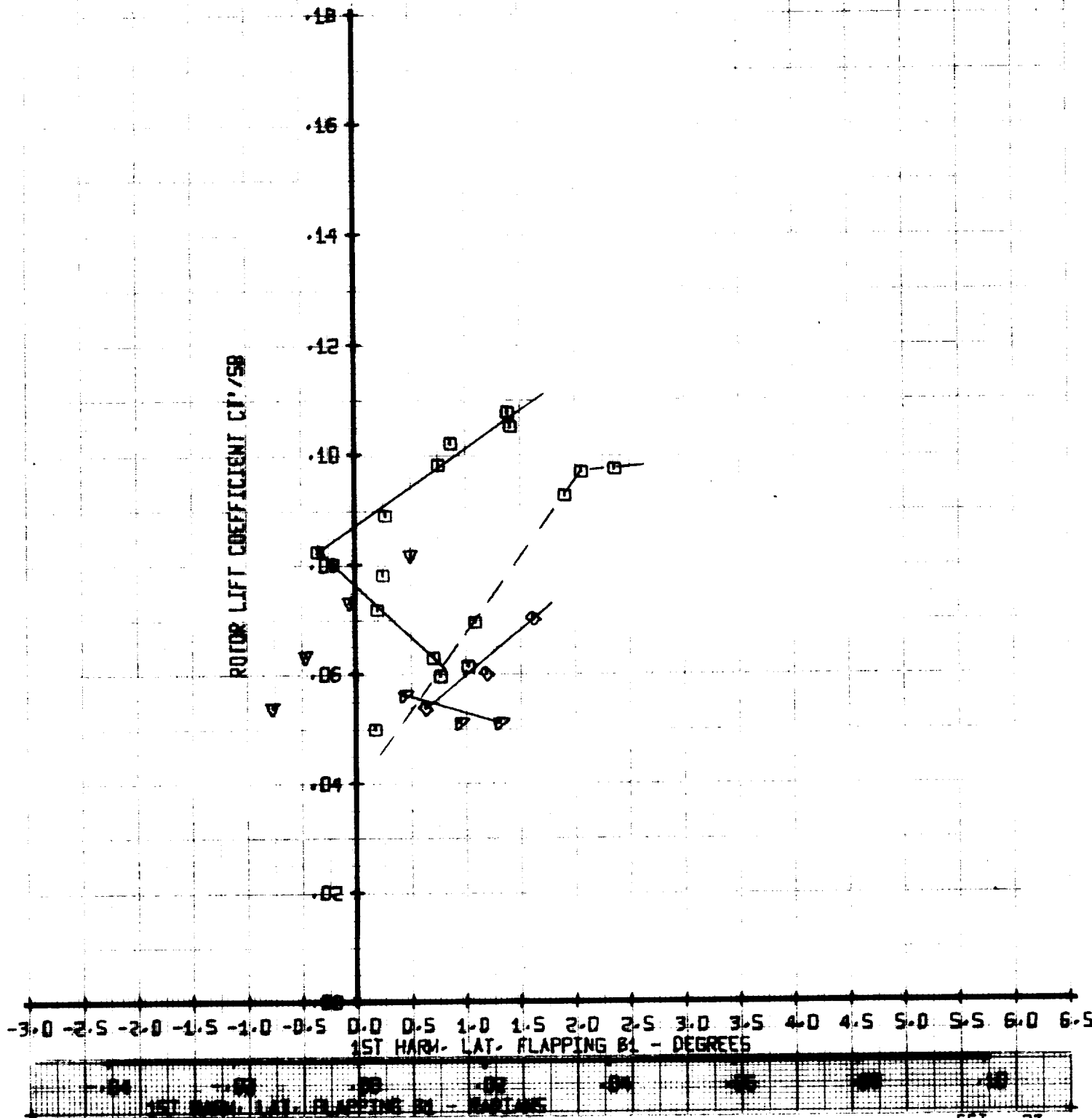
ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	REV	MLP	X/DD2SB	YTLIN
□	224	.53	.05	328
△	220	.53	.05	328
◇	221	.53	.05	328
▽	222	.53	.05	328

ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

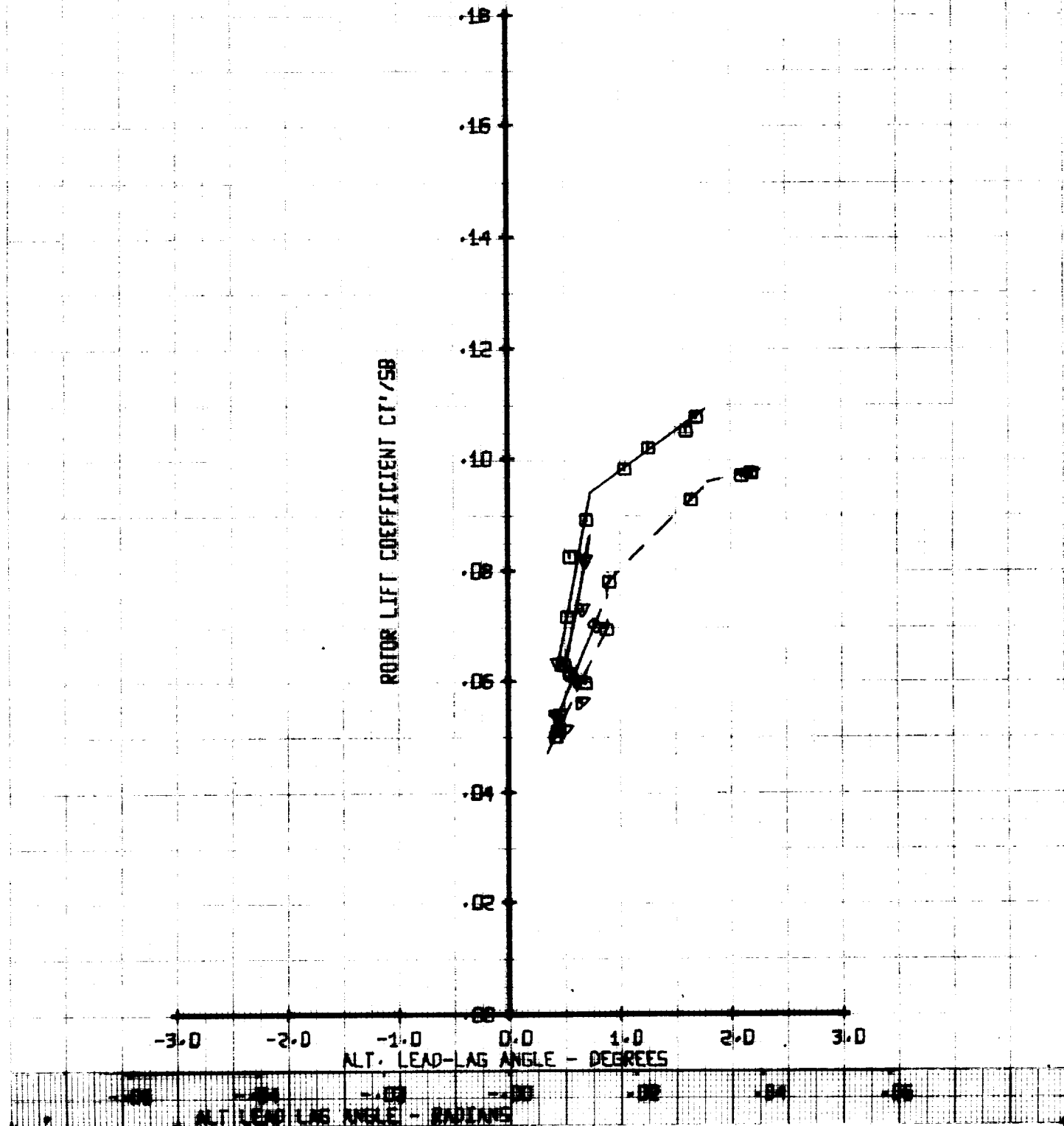


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	YTLIN
□	224	.53	.05	328
△	220	.53	.05	328
◇	221	.53	.05	328
▽	222	.53	.05	328

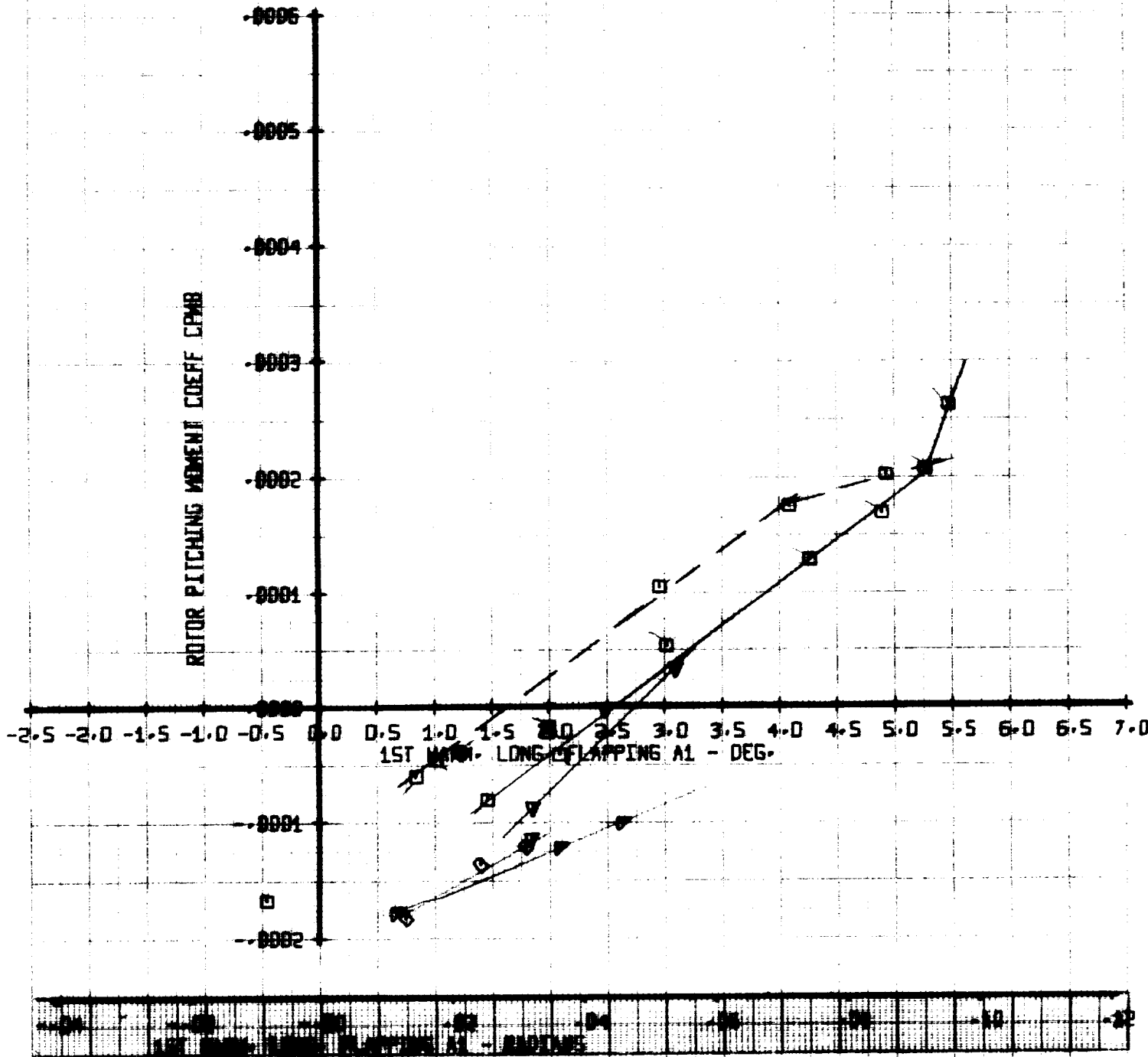
ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MLI'	X/DD258	YTLIN
□	224	.53	.05	328
△	220	.53	.05	328
◇	221	.53	.05	328
▽	222	.53	.05	328

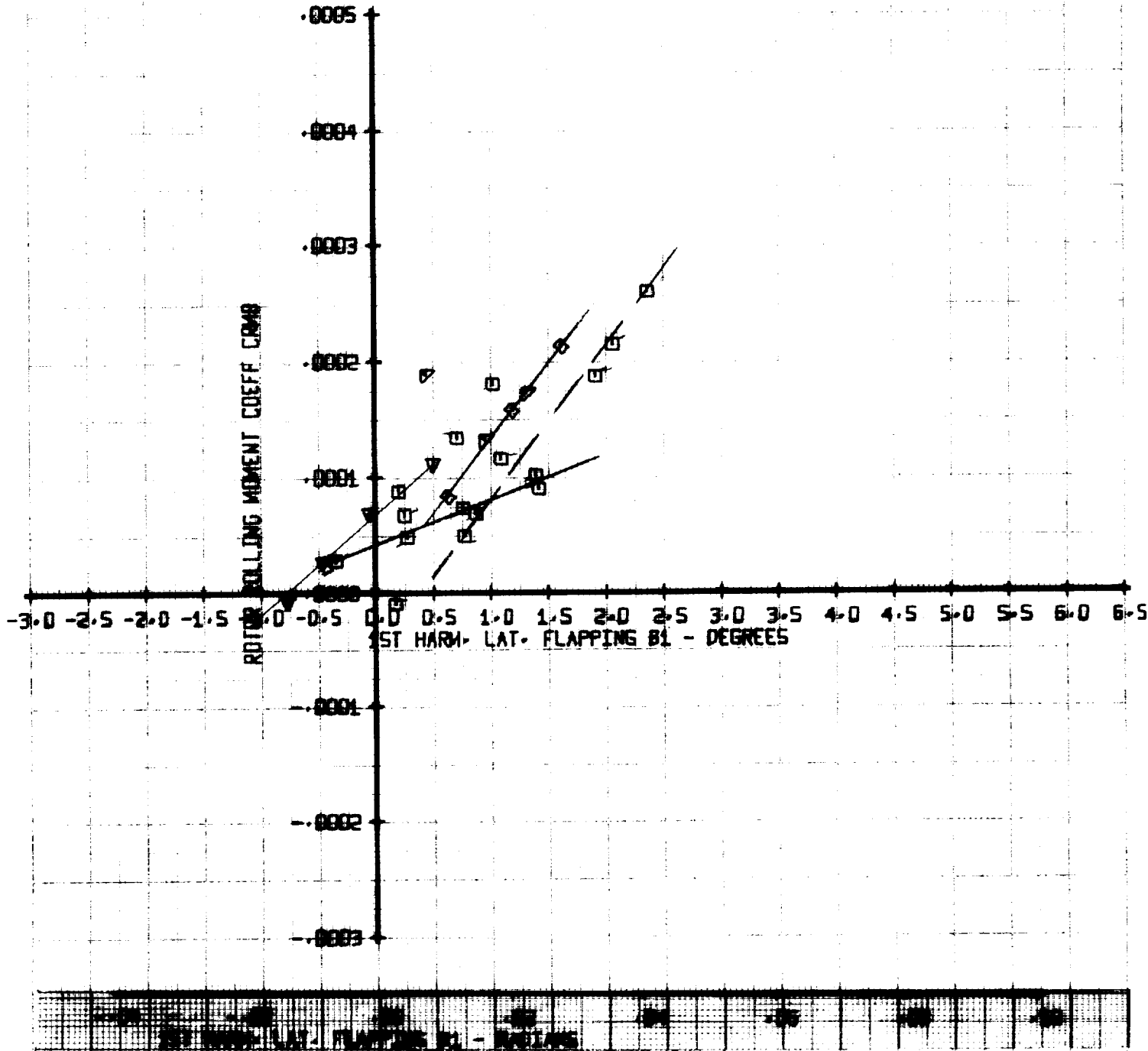
ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MLI'	X/QD2SB	YTLIN
□	224	.53	.05	328
△	220	.53	.05	328
◇	221	.53	.05	328
▽	222	.53	.05	328

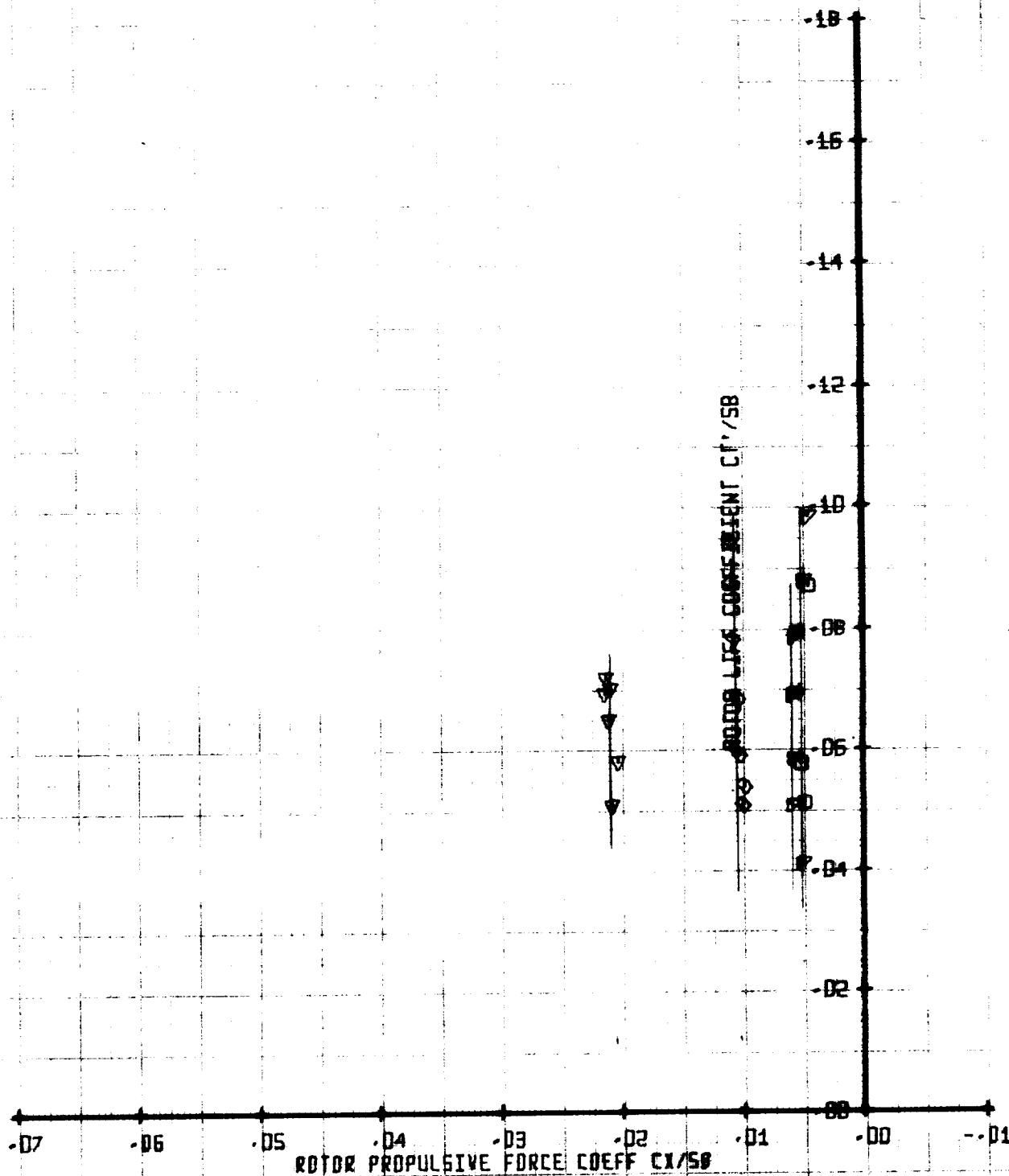
ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND				
SYM	RUN	ML'	X/00258	VTIN
□	246	.57	.025	358
▽	249	.57	.025	358
◇	228	.57	.05	358
▽	245	.57	.10	358

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PROPULSIVE FORCE COEFFICIENT

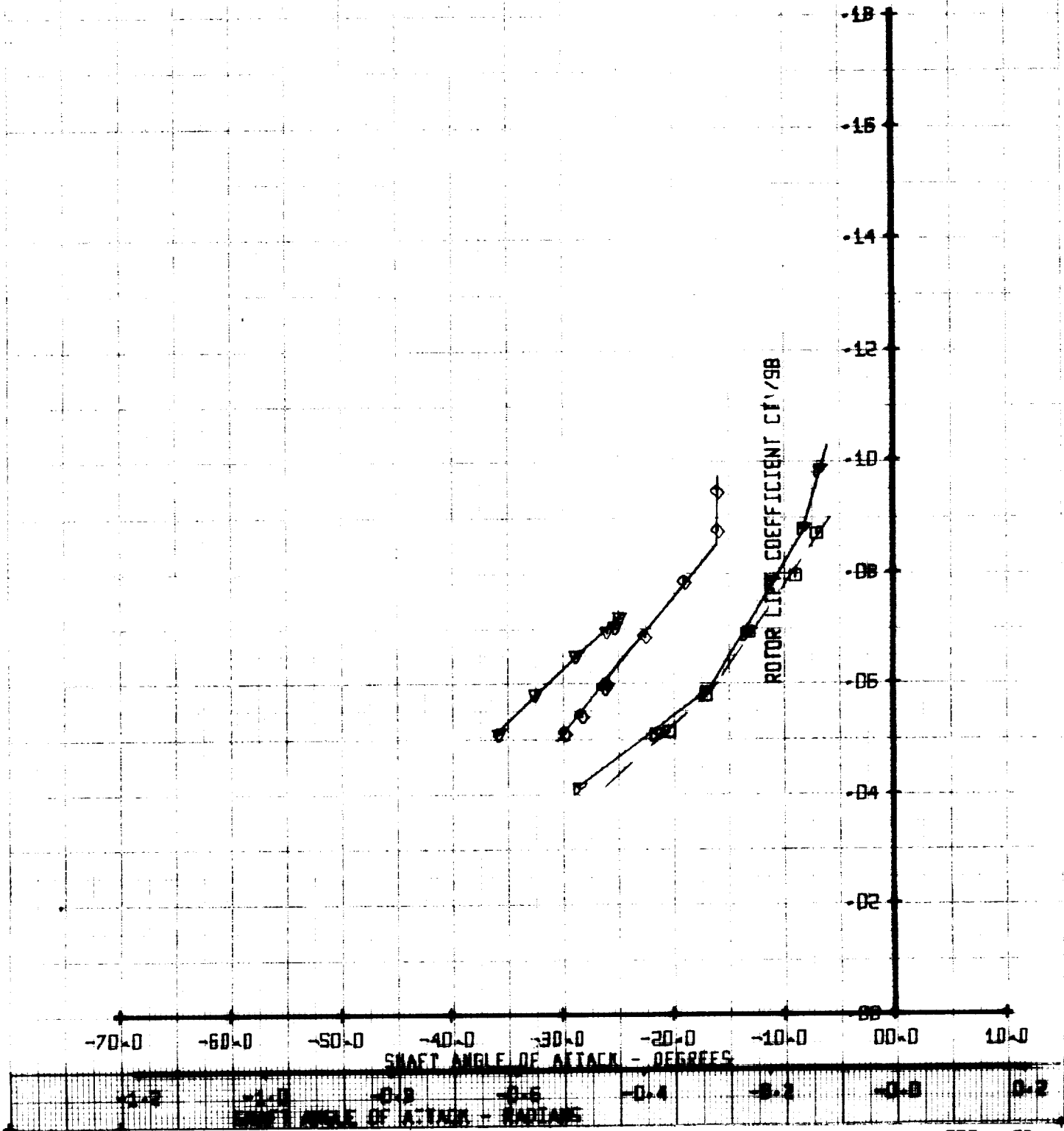


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VLIN
□	246	.57	.025	353
◇	249	.57	.025	353
◇	228	.57	.05	353
▽	245	.57	.10	353

ROTOR LIFT COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK



SET 38
BVWT 193

Figure A-229

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10-SCALE CH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTUN
□	246	.57	.025	353
◇	249	.57	.025	353
◇	228	.57	.05	353
▽	245	.57	.10	

ROTOR LIFT COEFFICIENT
 VERSUS
 COLLECTIVE PITCH

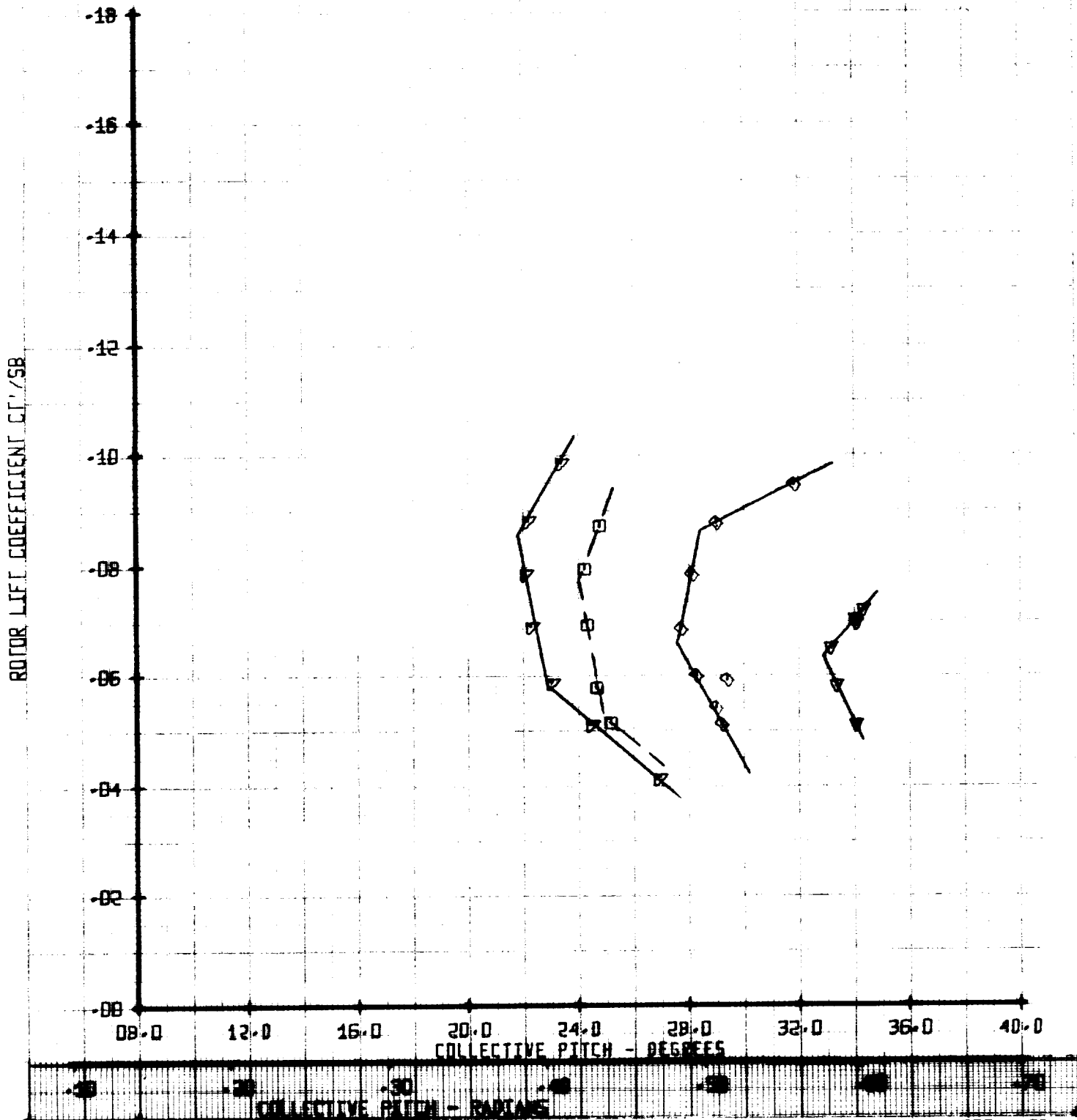


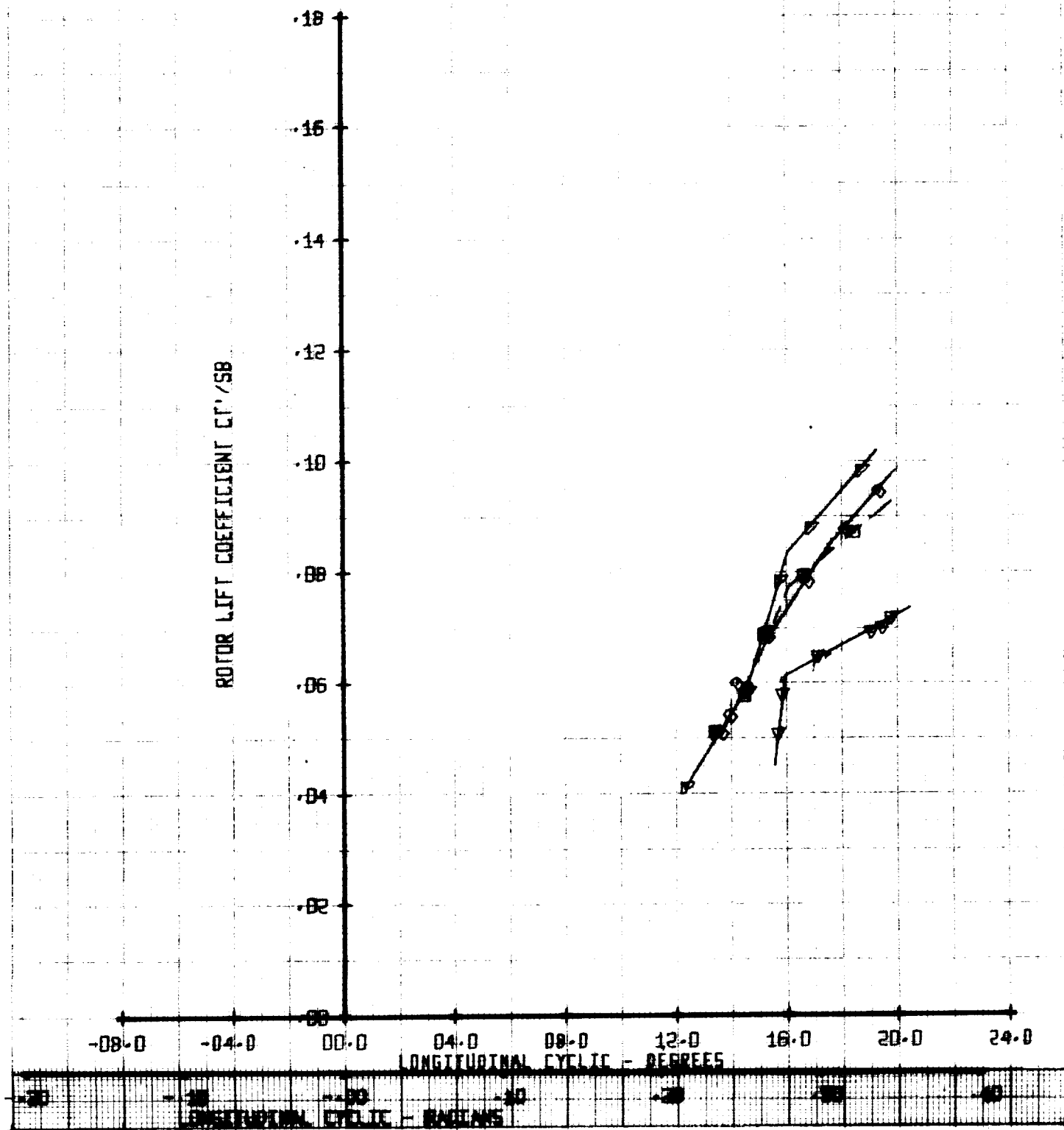
Figure A-230

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DD298	VTUN
□	246	.57	.025	353
▽	249	.57	.025	353
◇	228	.57	.05	353
▽	245	.57	.10	353

ROTOR LIFT COEFFICIENT
VERSUS
LONGITUDINAL CYCLIC



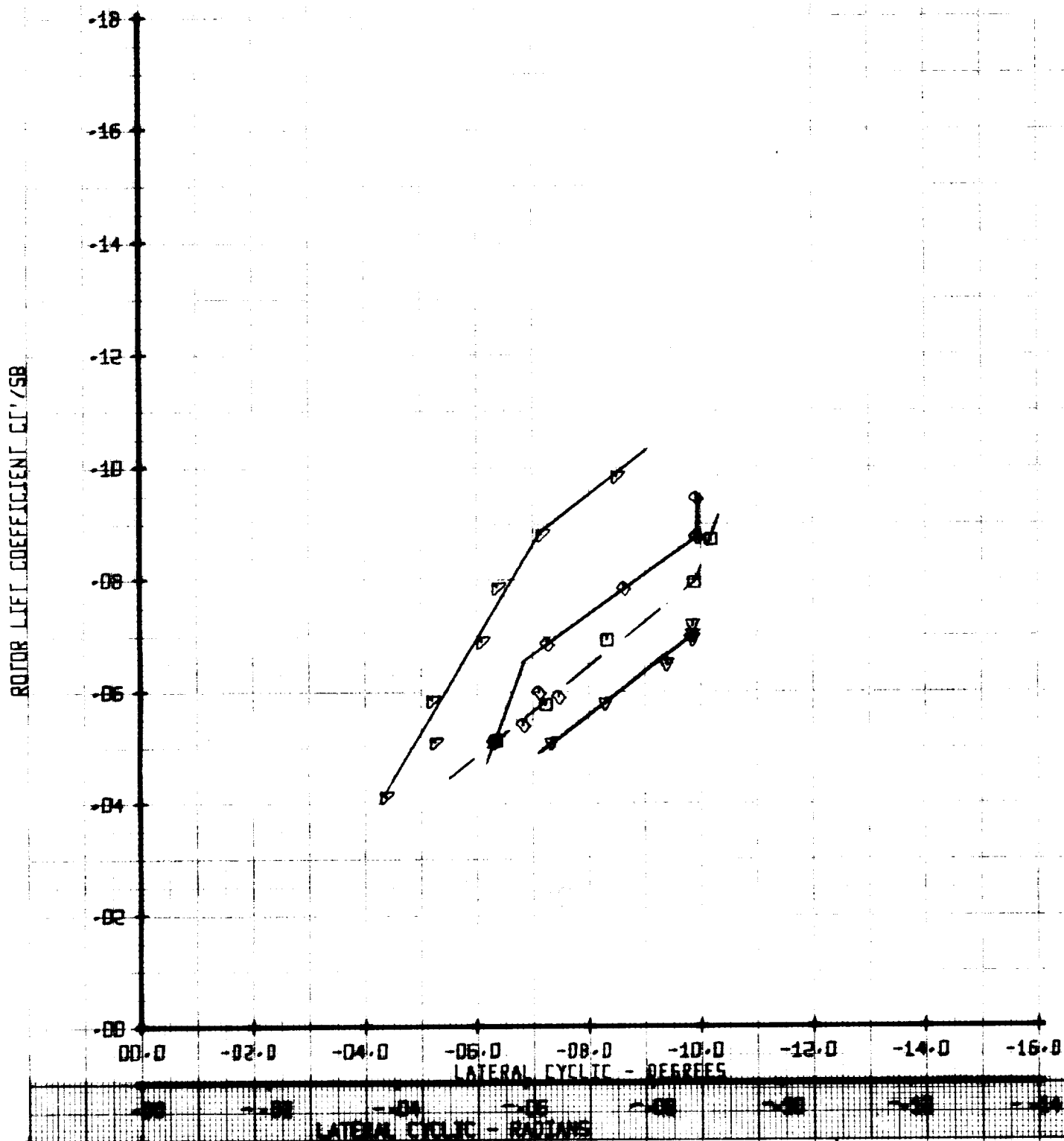
SET 38
BWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/DD258	VTUN
□	246	.57	.025	353
◻	249	.57	.025	353
◊	228	.57	.05	353
▽	245	.57	.10	353

ROTOR LIFT COEFFICIENT
VERSUS
LATERAL CYCLIC

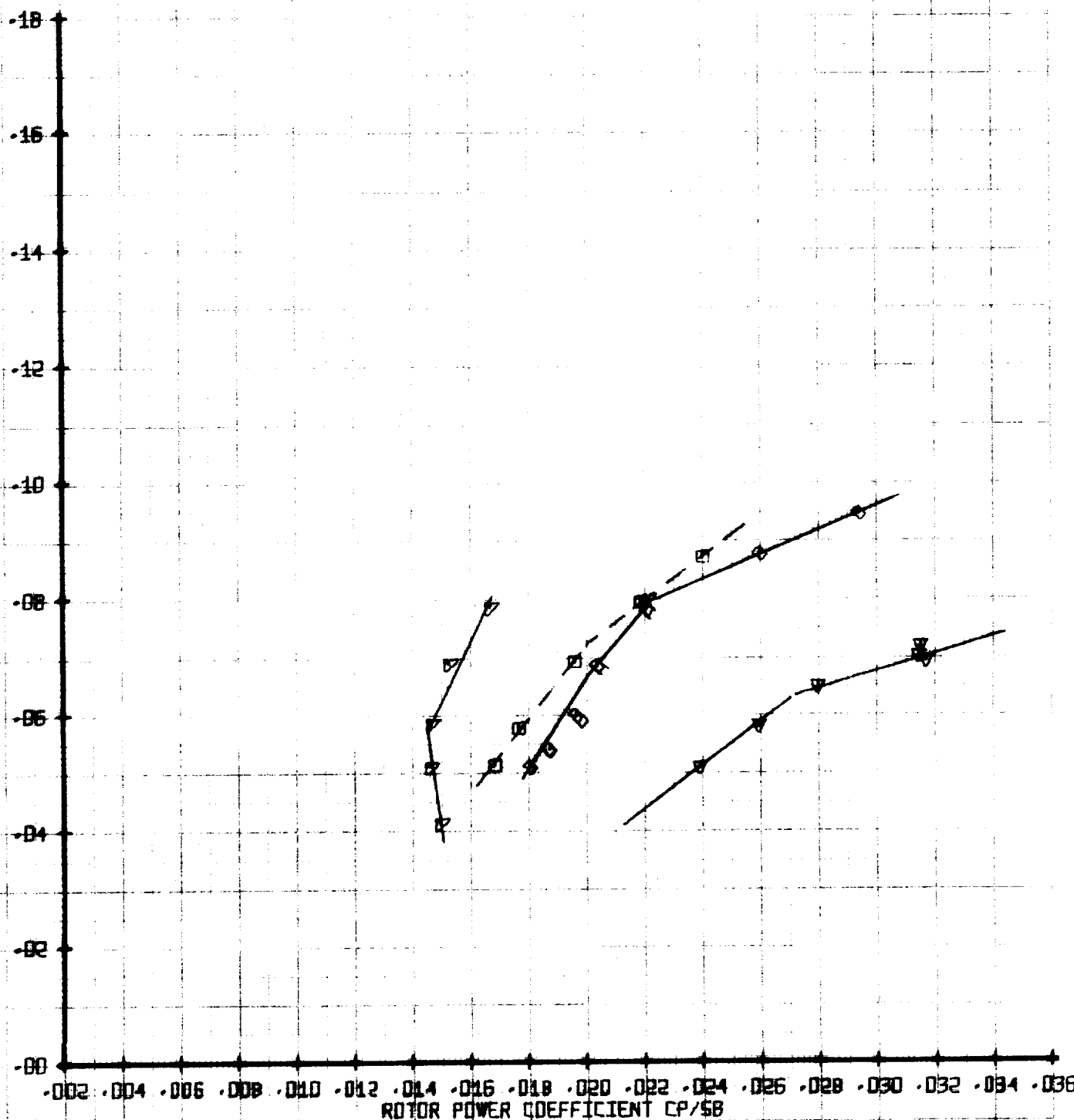


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	YTLN
□	246	.57	.025	353
◻	249	.57	.025	353
◇	228	.57	.05	353
▽	245	.57	.10	353

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT

ROTOR LIFT COEFFICIENT C_L'/SB 

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	YTUN
□	246	.57	.025	353
△	249	.57	.025	353
◇	248	.57	.05	353
▽	245	.57	.10	353

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT

$V_{T,P} = 620 \text{ FPS}$

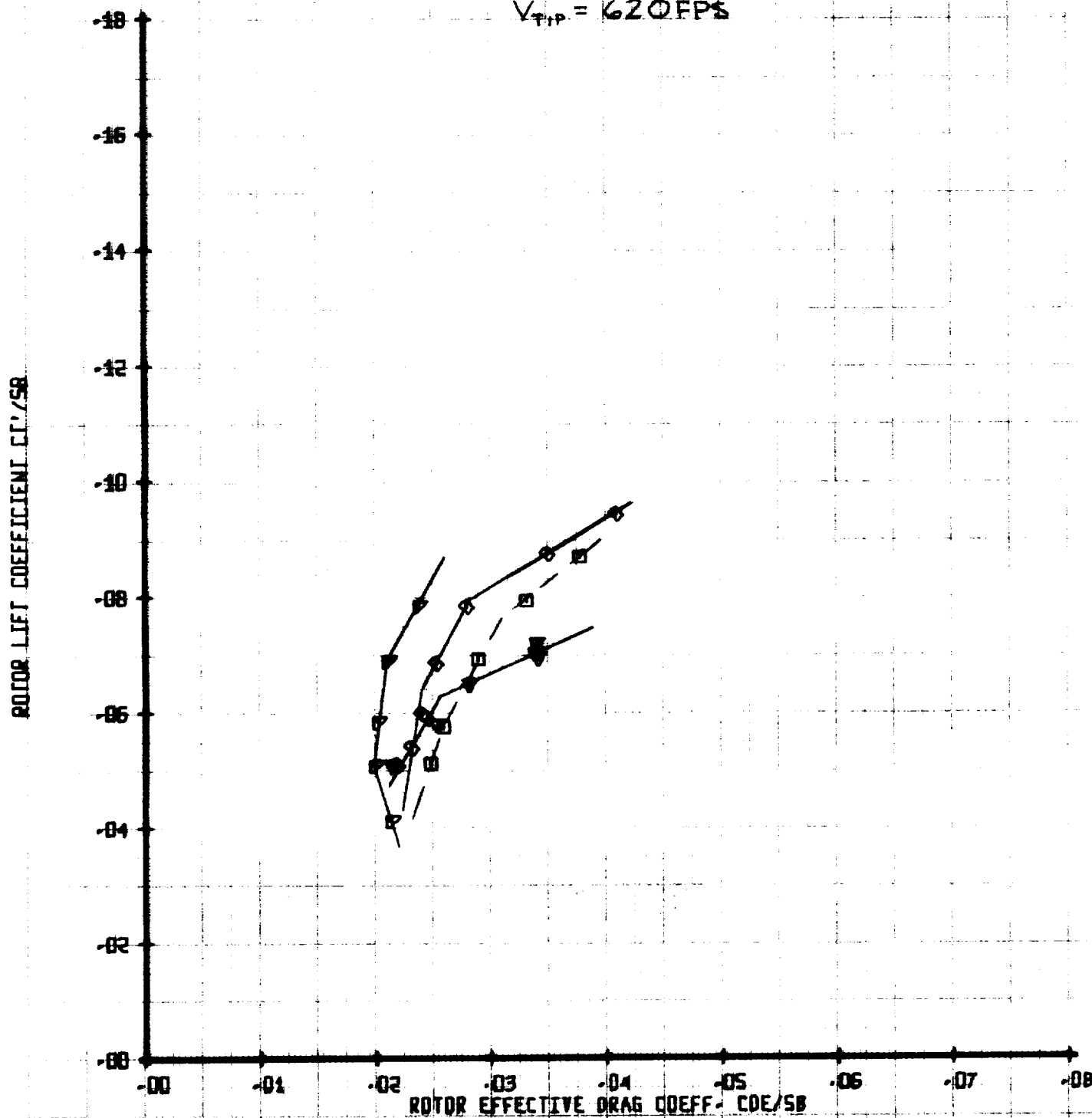


Figure A-233

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	246	.57	.025	353
▤	249	.57	.025	353
◊	228	.57	.05	353
▥	245	.57	.10	353

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

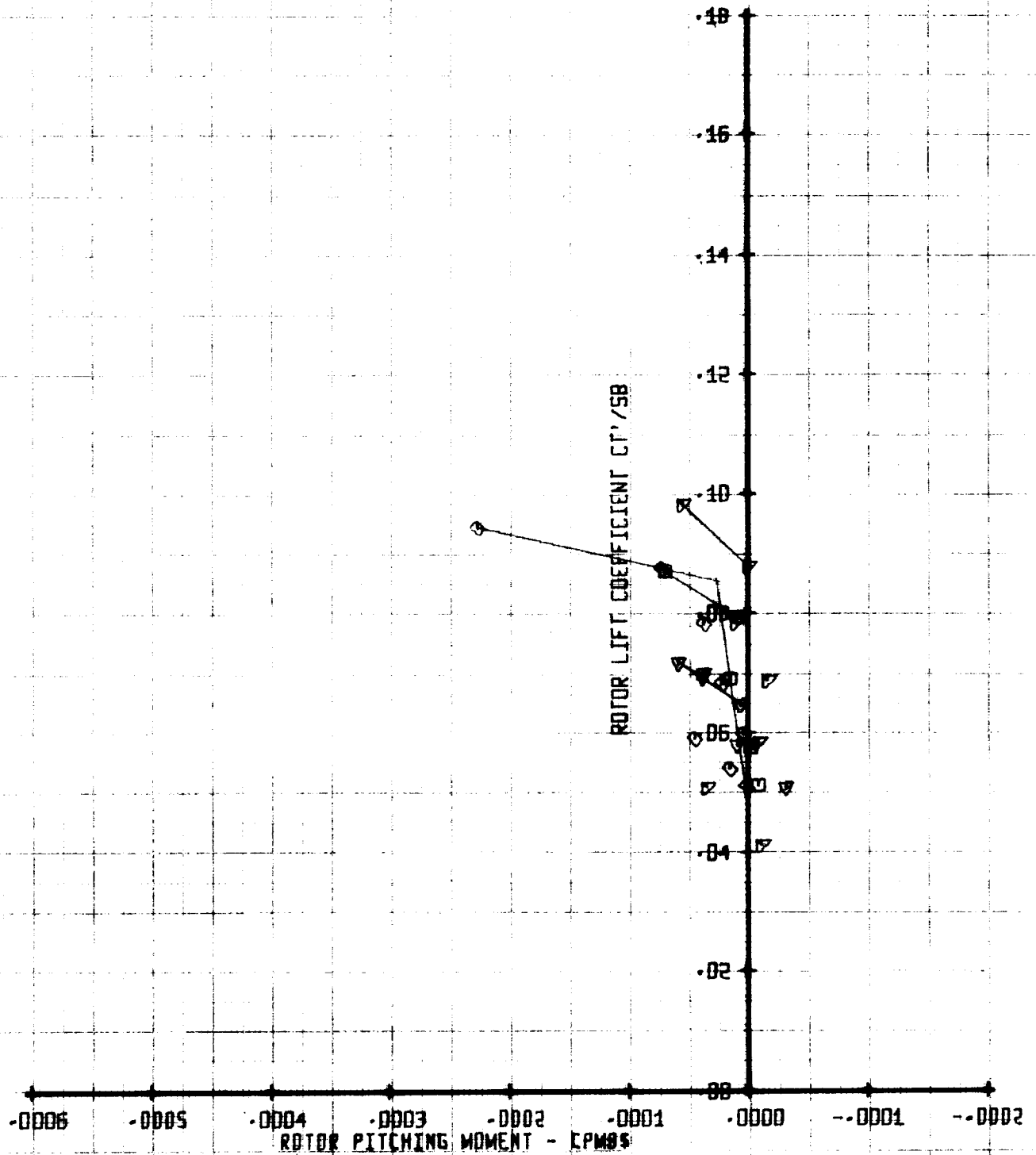


Figure A-234

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/OD258	VTUN
□	246	.57	.025	353
▽	249	.57	.025	353
◇	228	.57	.05	353
▽	245	.57	.10	353

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT

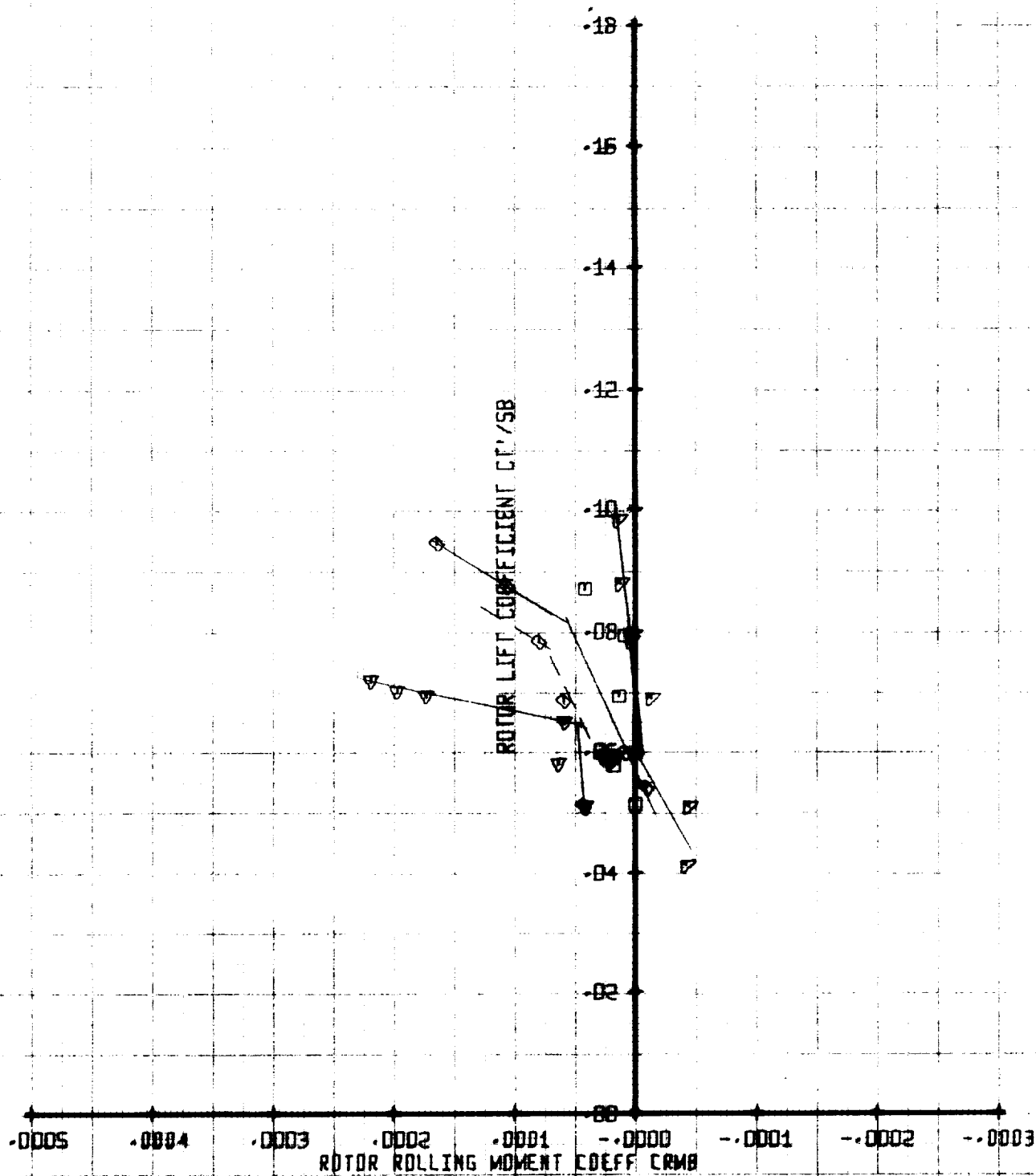


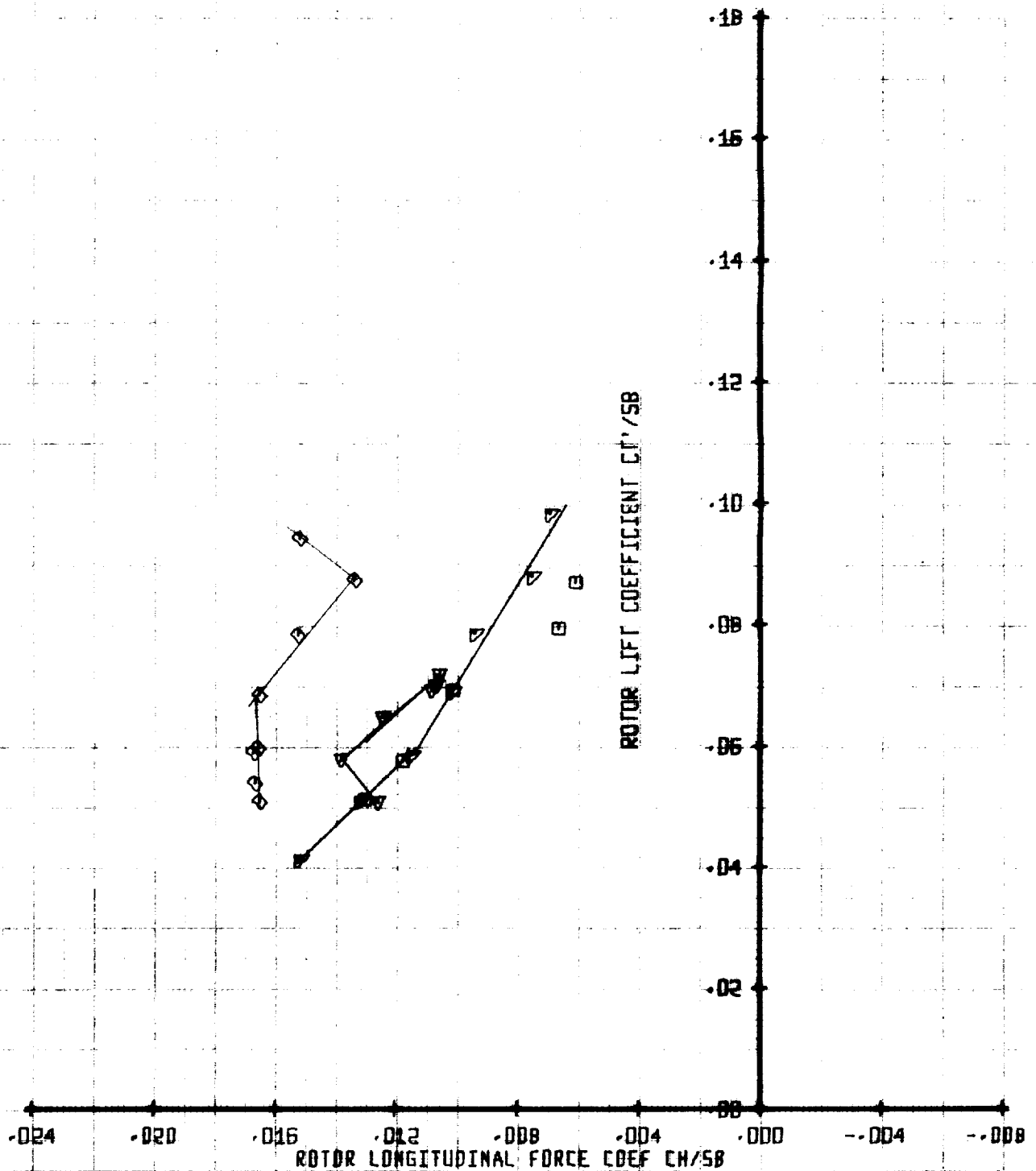
Figure A-235

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUM
□	246	.57	.025	353
◇	249	.57	.025	353
◇	228	.57	.05	358
▽	245	.57	.10	358

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DD2SB	VTUN
○	246	.57	.025	353
△	249	.57	.025	353
◇	228	.57	.05	353
▽	245	.57	.10	353

Figure A-236

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT

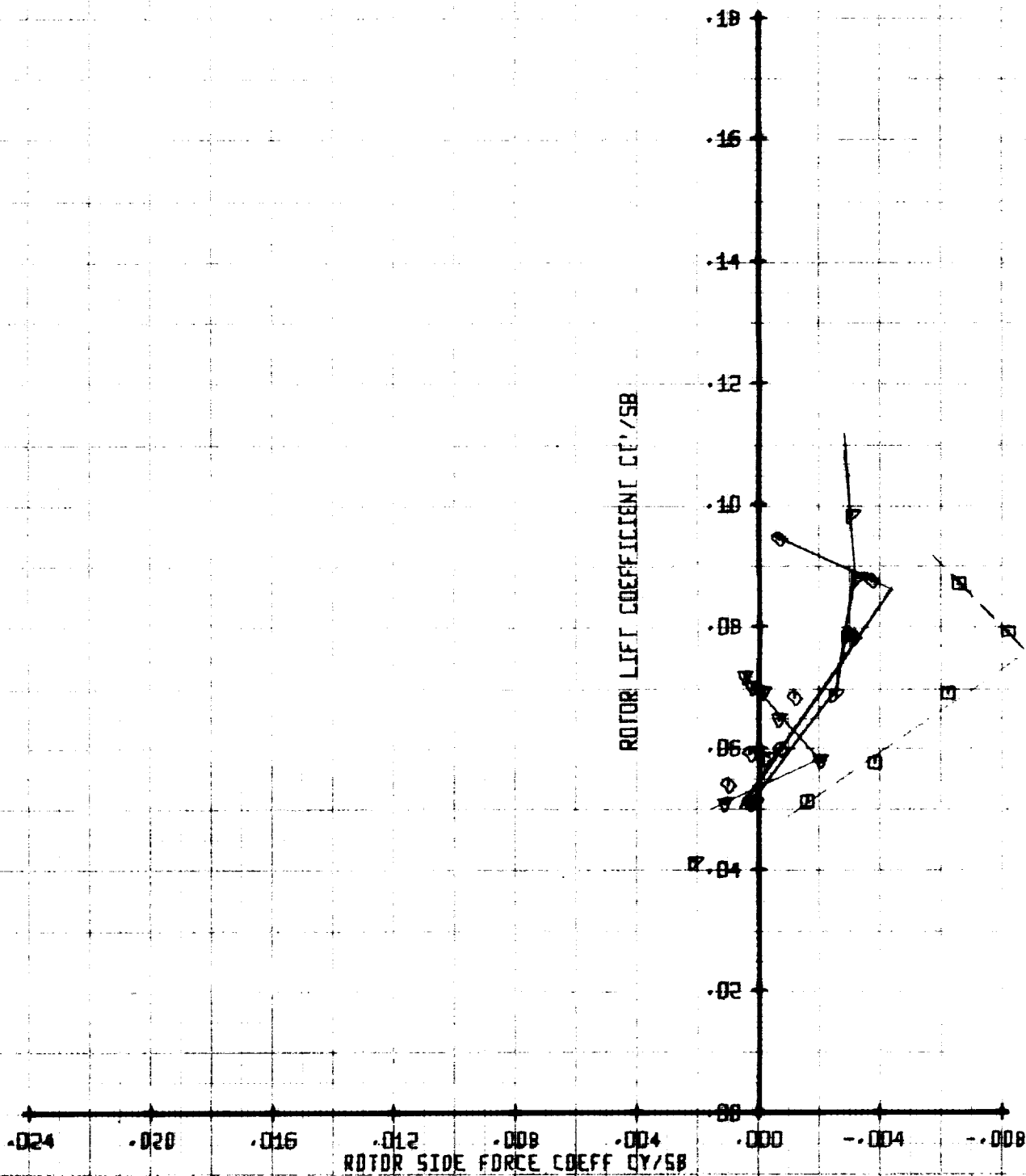


Figure A-237

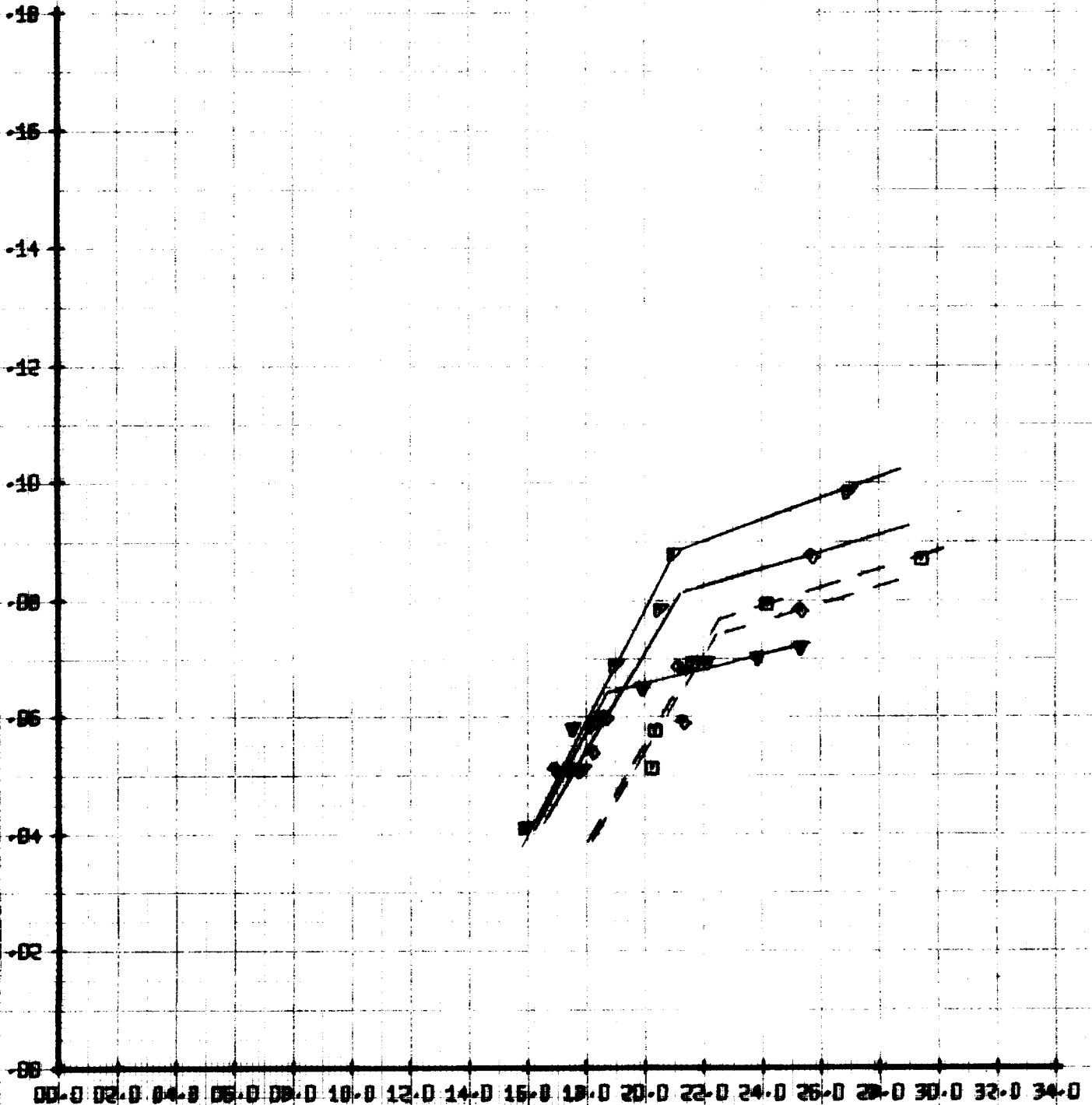
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	BLN	MI'	X/00258	YTLN
□	246	.57	.025	353
◊	249	.57	.025	353
◆	238	.57	.05	353
▼	245	.57	.10	353

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

ROTOR LIFT COEFFICIENT $C_L/58$

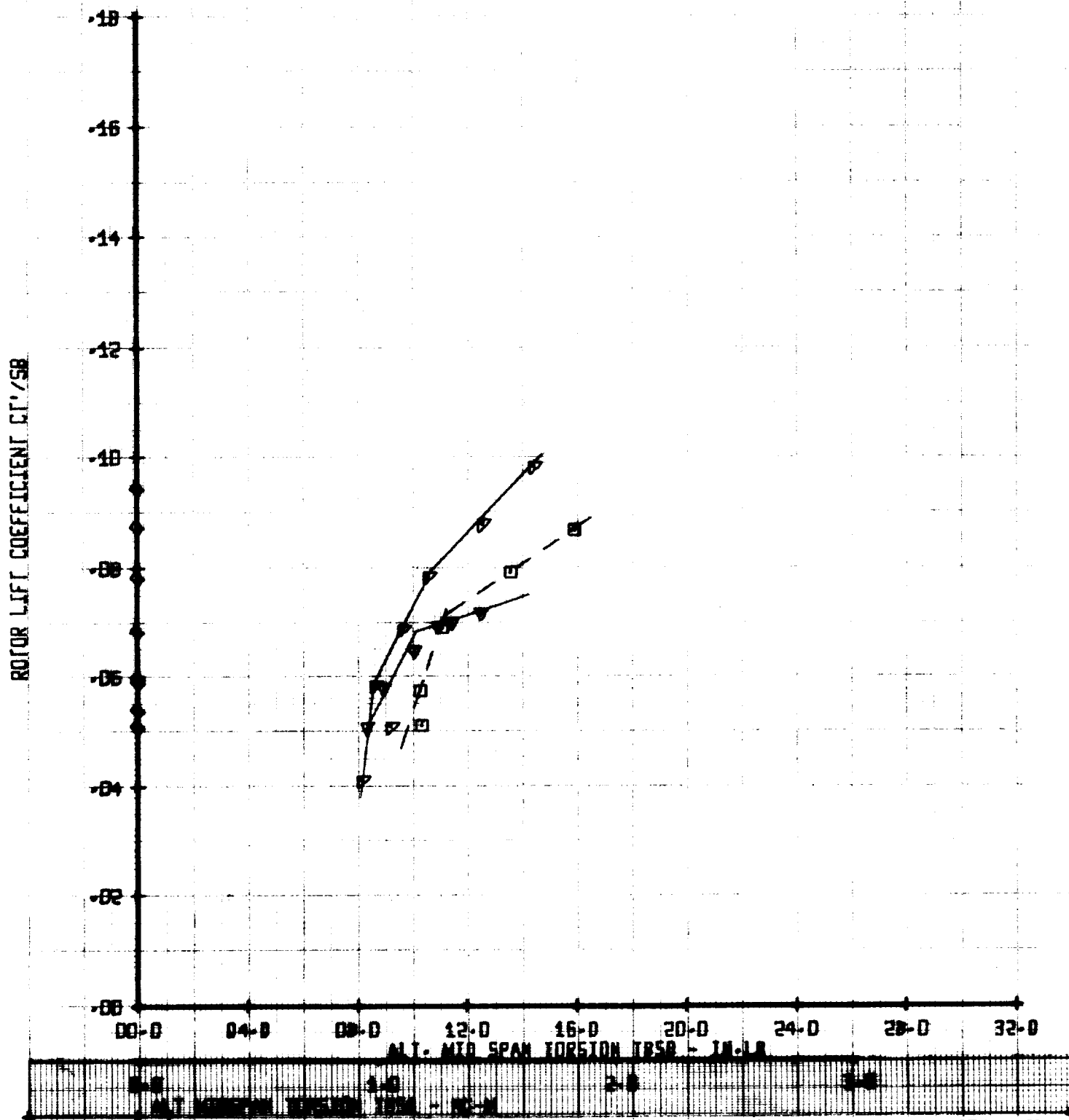


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUM
○	246	.57	.025	358
△	249	.57	.025	358
◇	238	.57	.05	358
▽	245	.57	.10	358

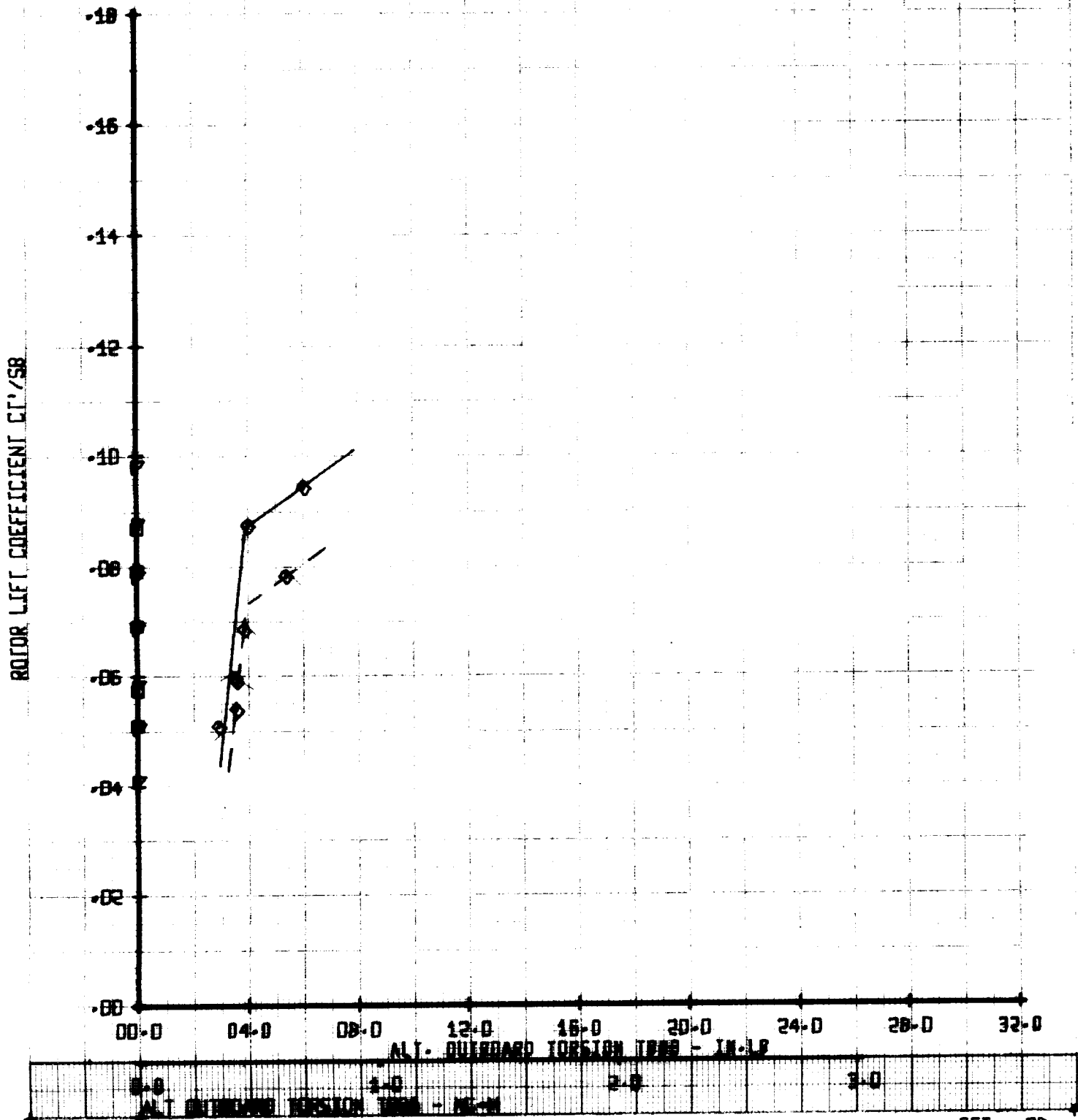
ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM	BLN	MU'	X/DD258	VTUN
○	246	.57	.025	353
△	249	.57	.025	353
◇	228	.57	.05	353
▽	245	.57	.10	353

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB80

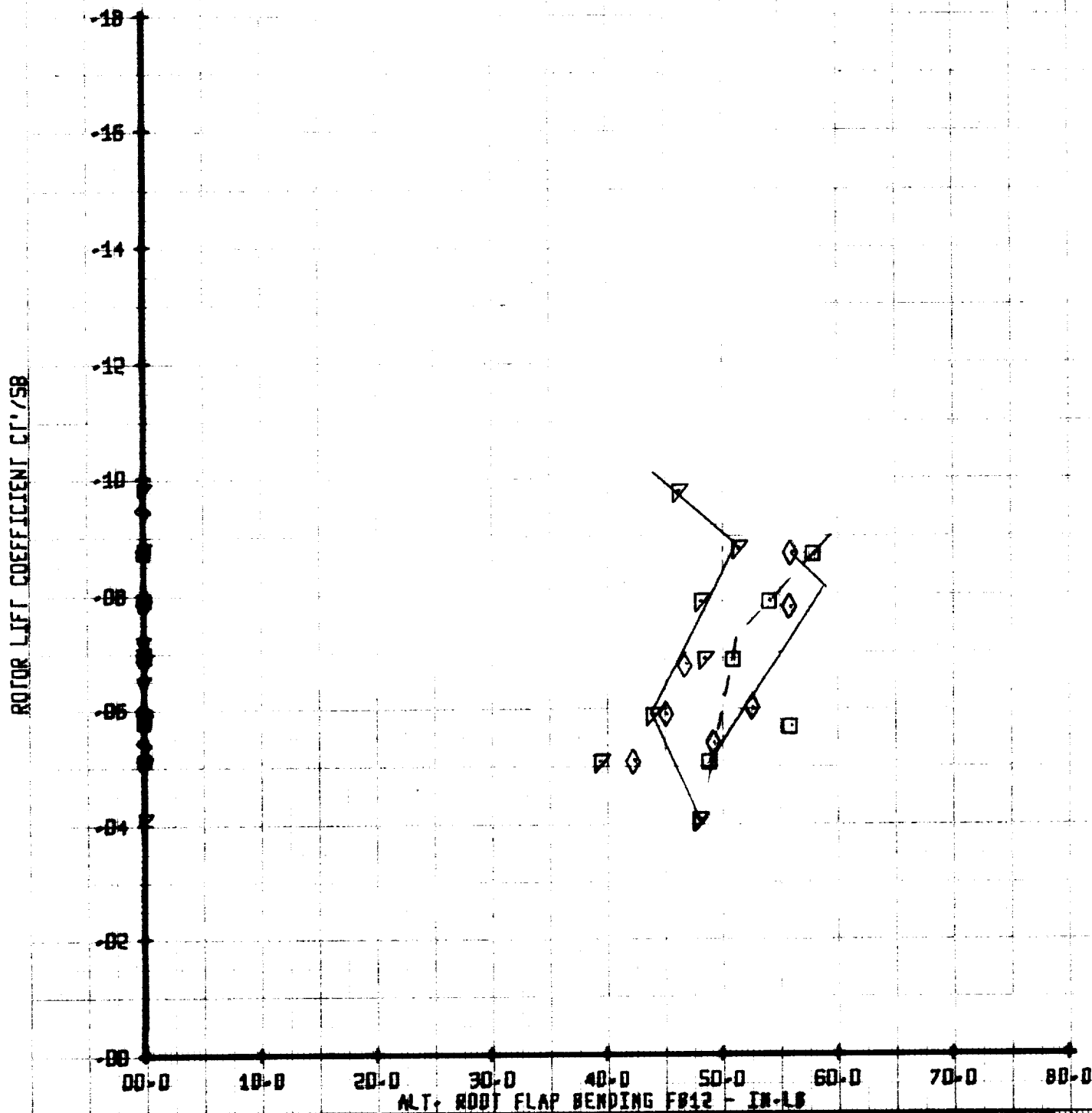


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

Figure A-240

SYM	RUN	ML'	X/00258	VTIM
□	246	.57	.025	358
▽	249	.57	.025	358
◆	228	.57	.05	358
▼	245	.57	.10	358

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

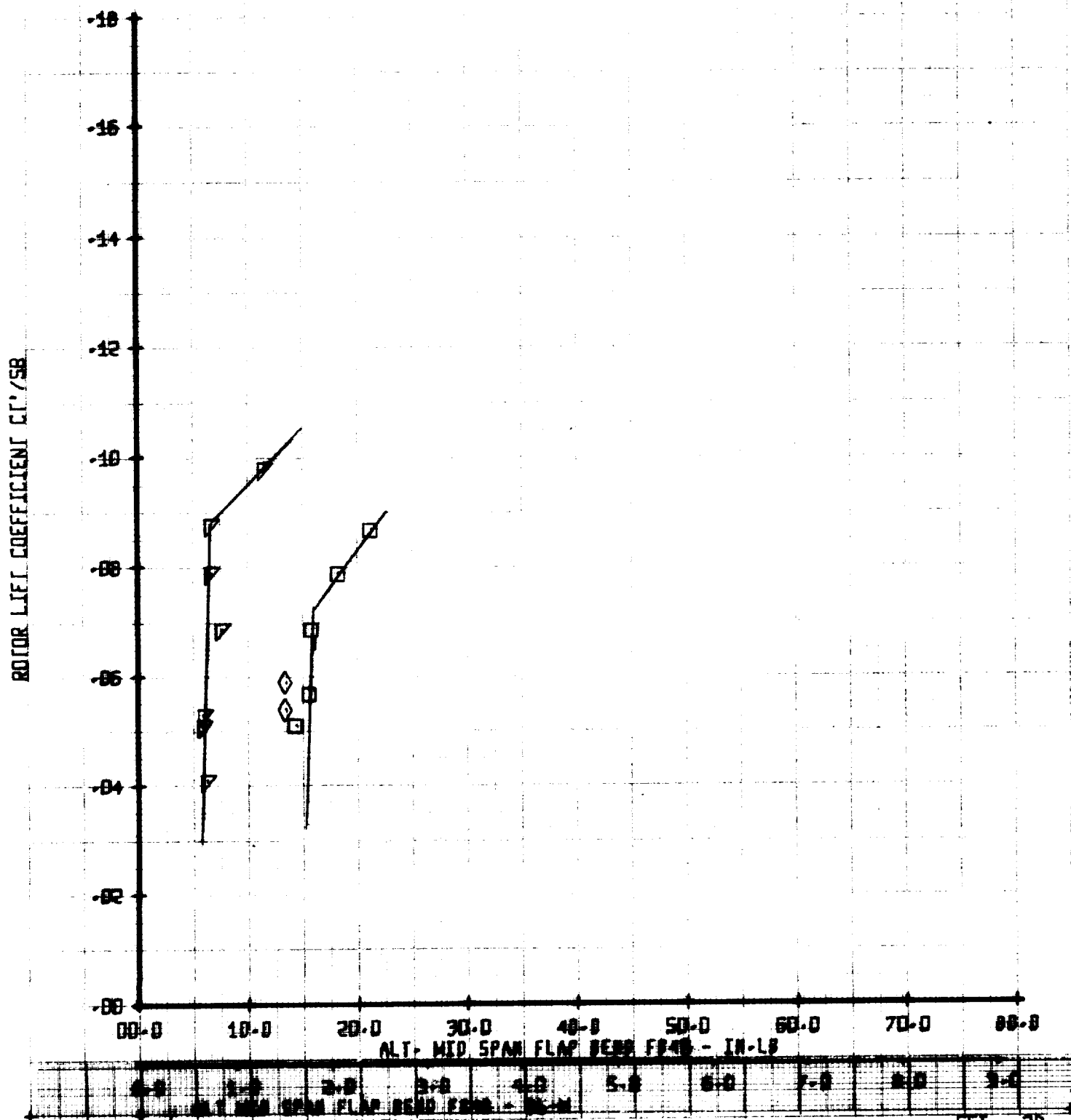


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	YTLN
□	246	.57	.025	353
◻	249	.57	.025	353
◇	238	.57	.05	353
▽	245	.57	.10	353

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN FLAP BEND FB48

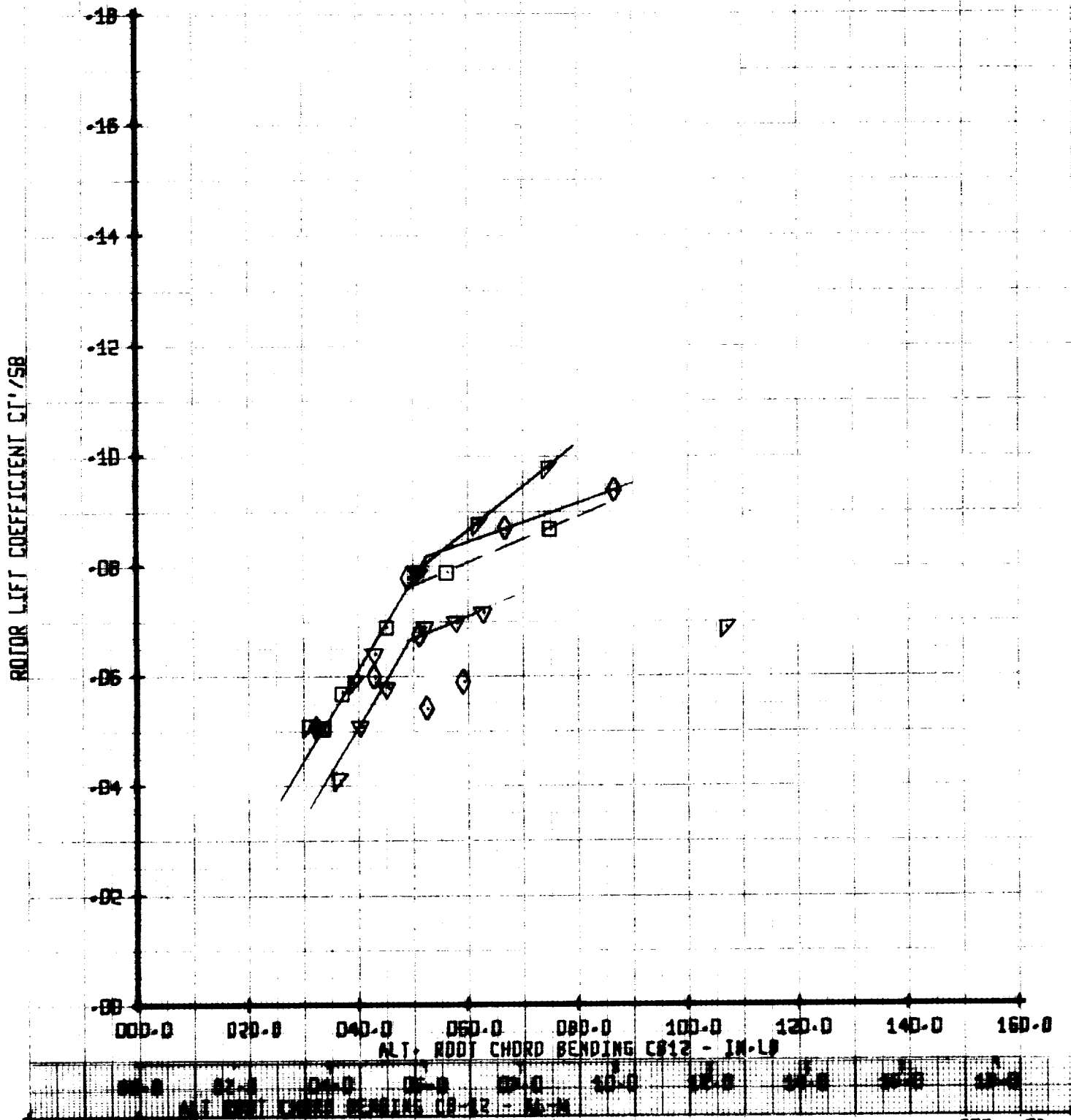


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RM	ML	X/D0258	VTLM
□	246	.57	.025	358
▽	249	.57	.025	358
◇	238	.57	.05	358
▽	245	.57	.10	358

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MLI'	X/QD2SB	Y/LIN
□	246	.57	.025	353
△	249	.57	.025	353
◇	248	.57	.05	353
▽	245	.57	.10	353

ROTOR LIFT COEFFICIENT
VERSUS
CONING ANGLE

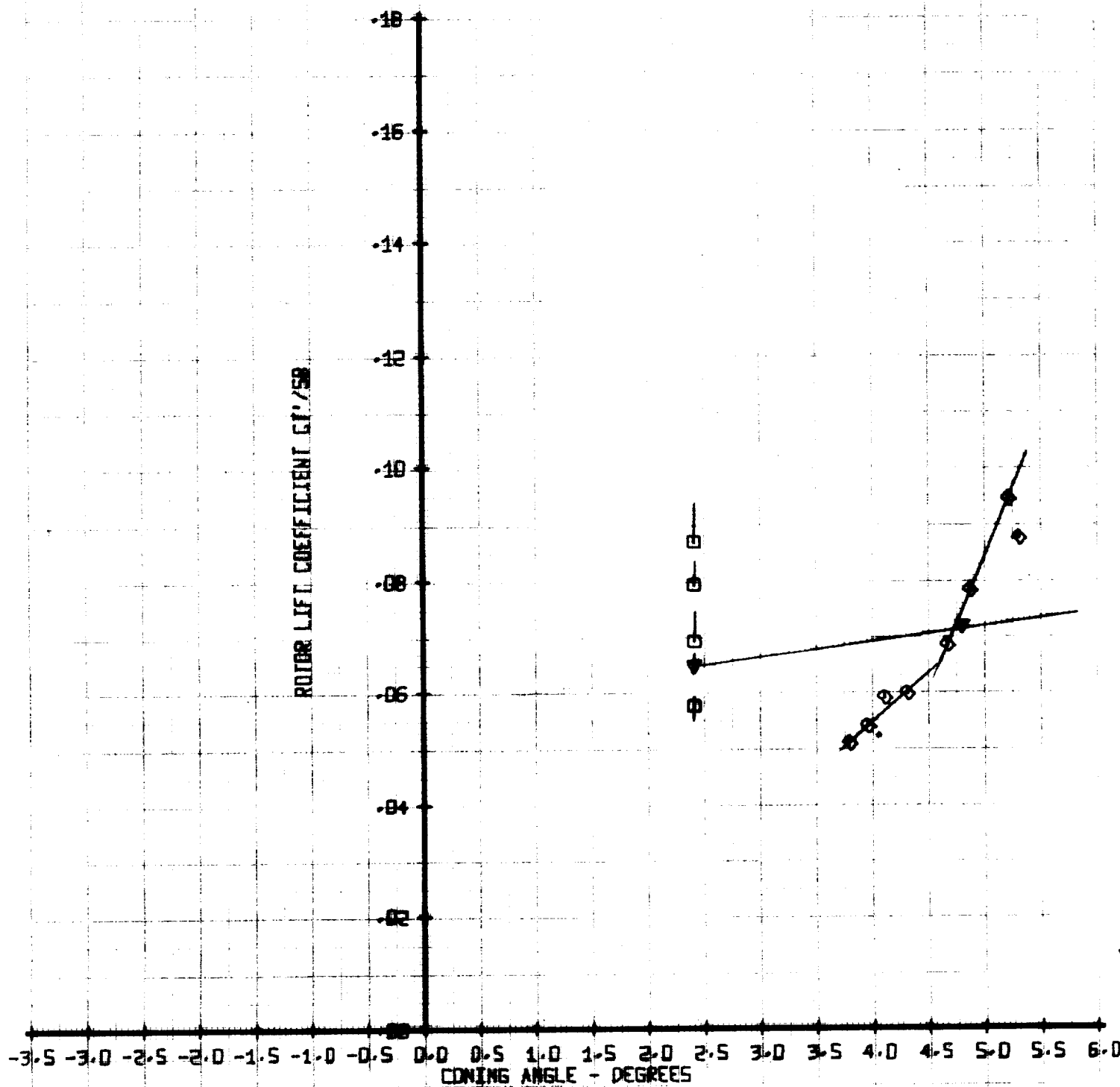


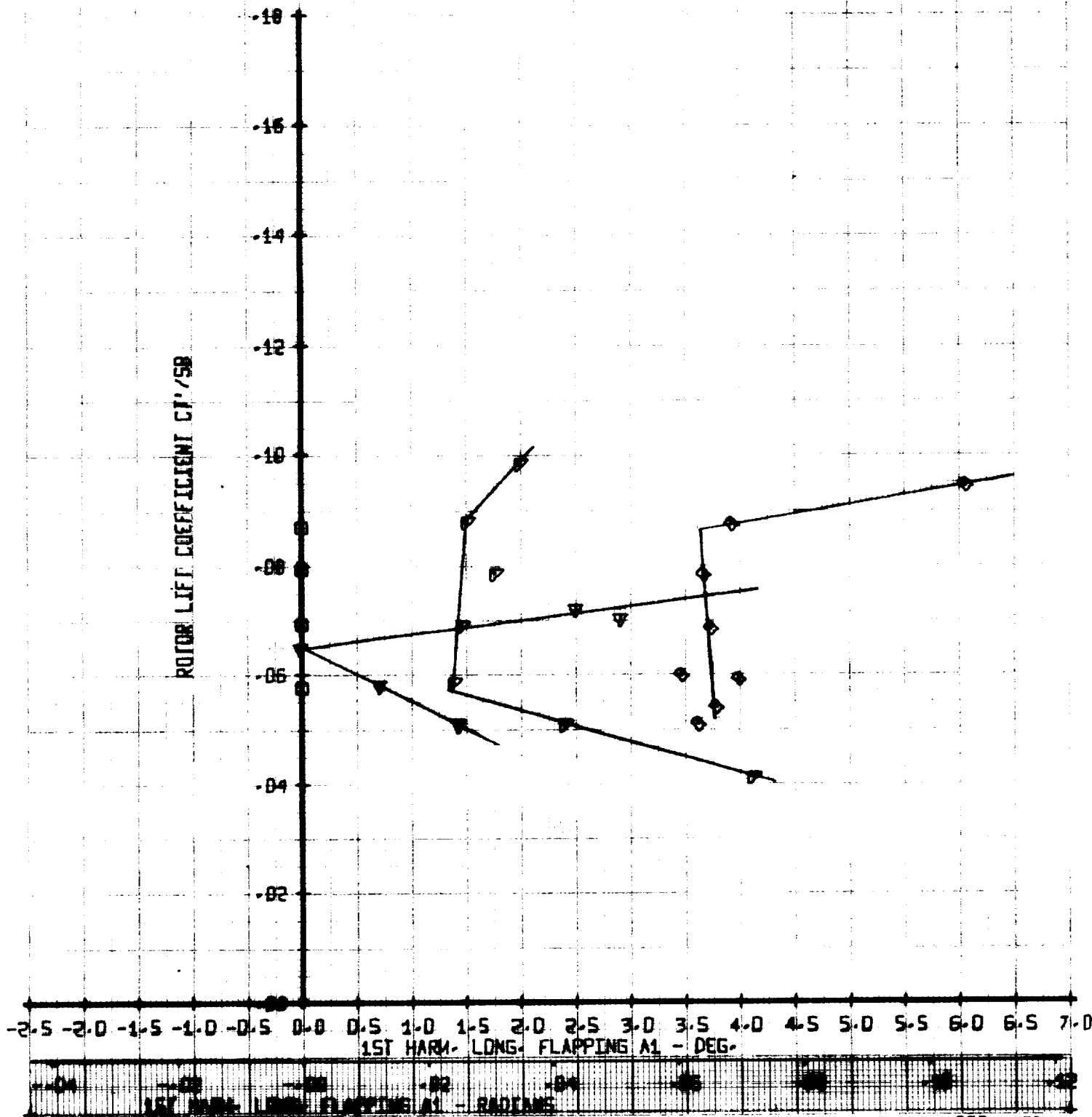
Figure A-244

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	BLIN	MU'	X/DP258	YTLIN
○	246	.57	.025	353
△	249	.57	.025	353
◇	248	.57	.05	353
▽	245	.57	.10	353

ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING A1



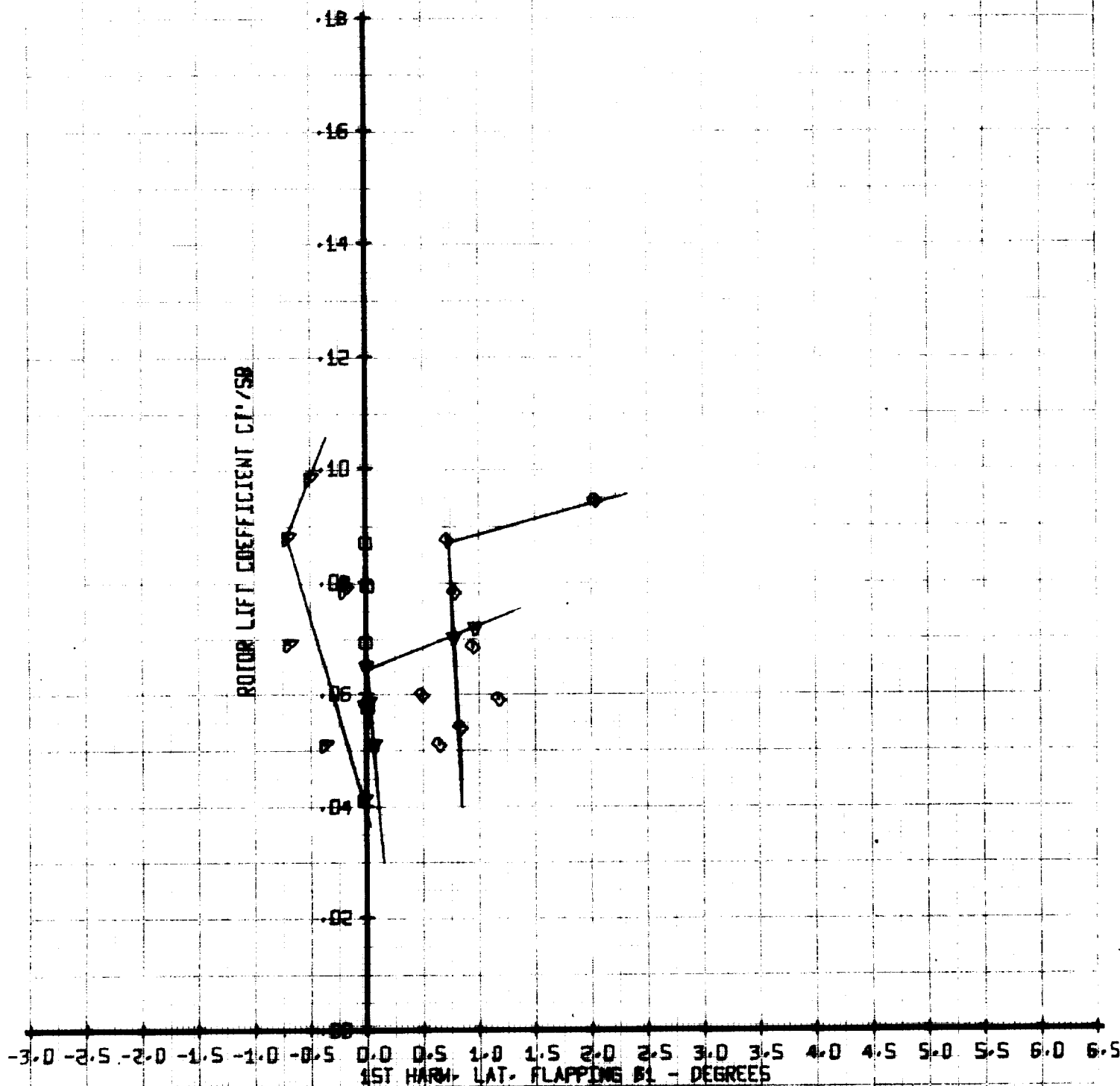
SET 38
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	BLIN	MLI'	X/00258	Y/LIN
□	246	.57	.025	353
△	249	.57	.025	353
◇	238	.57	.05	353
▽	245	.57	.10	353

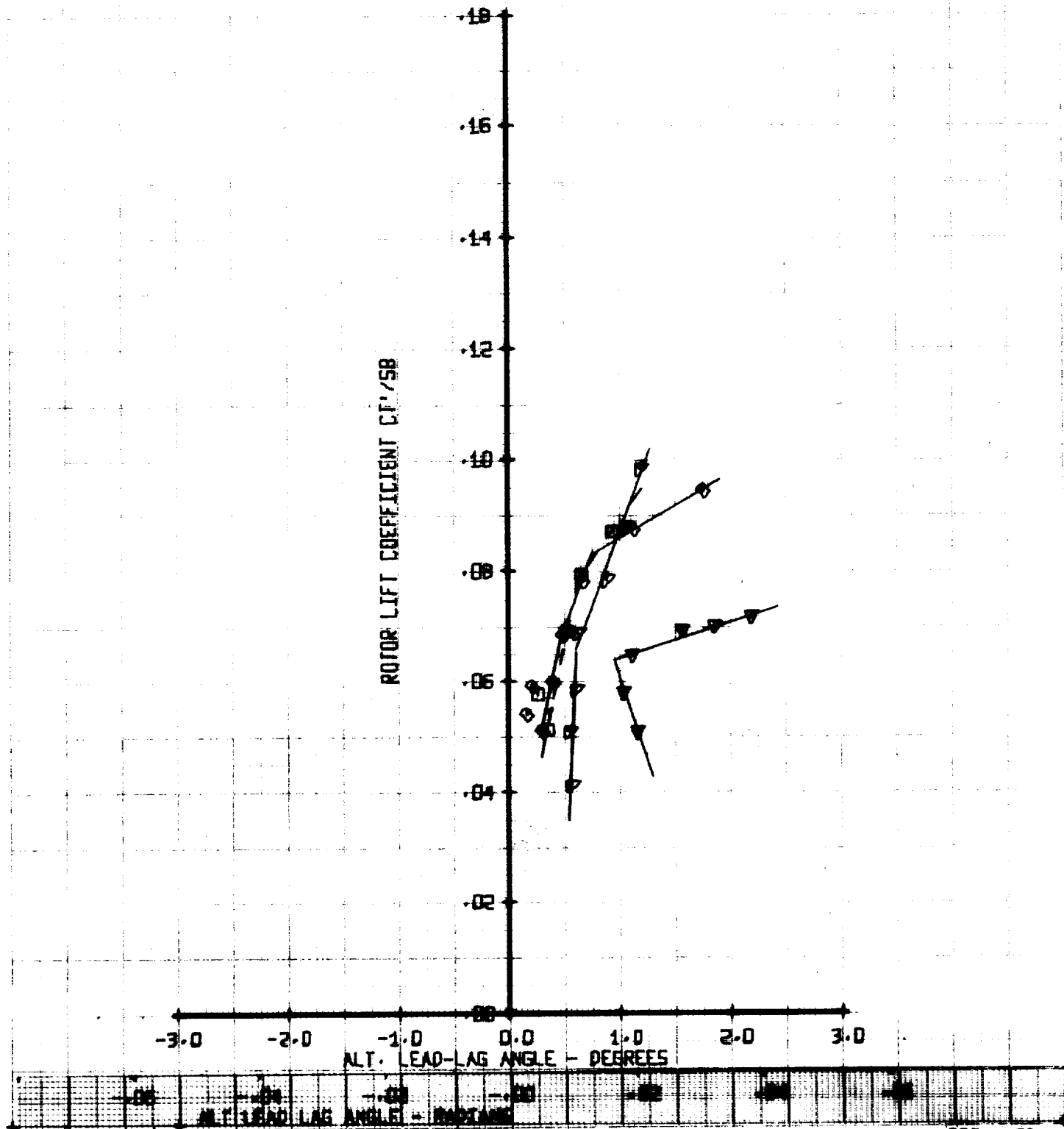
ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

SYM	RUN	MLP	X/00258	Y/LIN
□	246	.57	.025	353
◇	249	.57	.025	353
◆	228	.57	.05	353
▼	245	.57	.10	353

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE



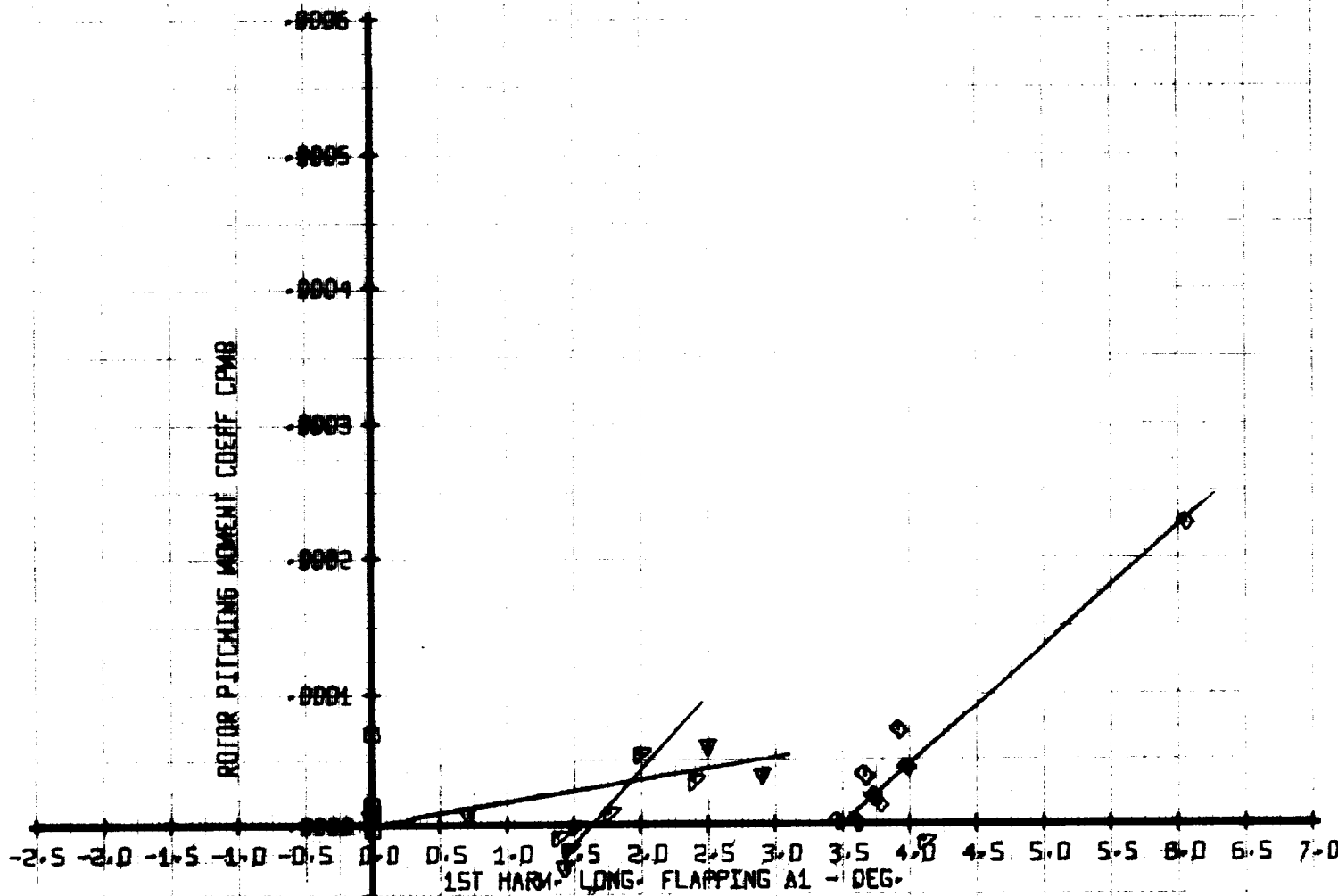
SET 38
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUM
□	246	.57	.025	353
◊	249	.57	.025	353
◆	228	.57	.05	353
▼	245	.57	.10	353

ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1



1ST HARM. LONG. FLAPPING A1 - DEGREE

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	YTUN
□	246	.57	.025	353
△	249	.57	.025	353
◇	228	.57	.05	353
▽	245	.57	.10	353

ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

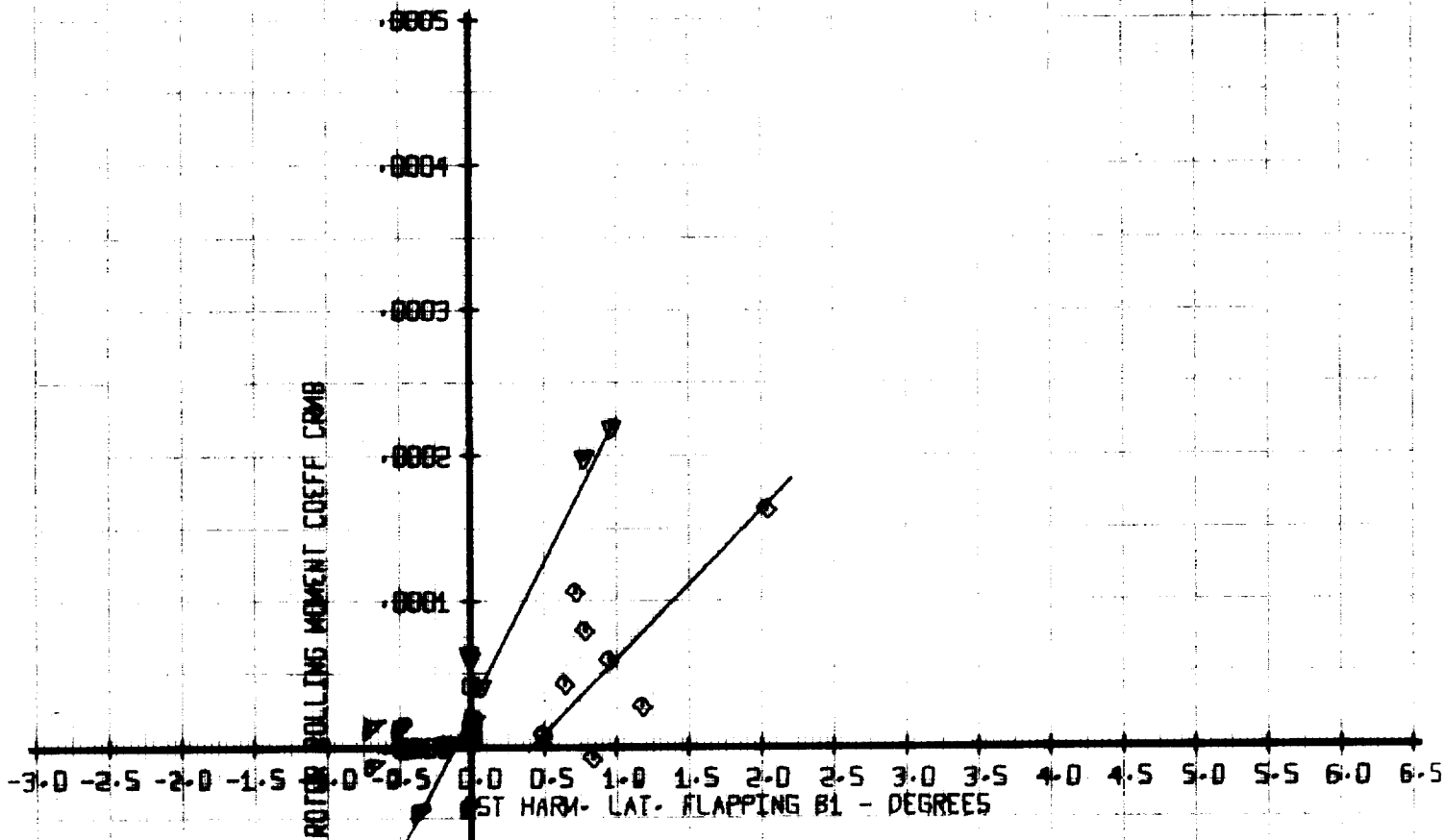


Figure A-249

LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM

RUN

MU

X/DD258

VLOM

□

229

.61

.05

378

▽

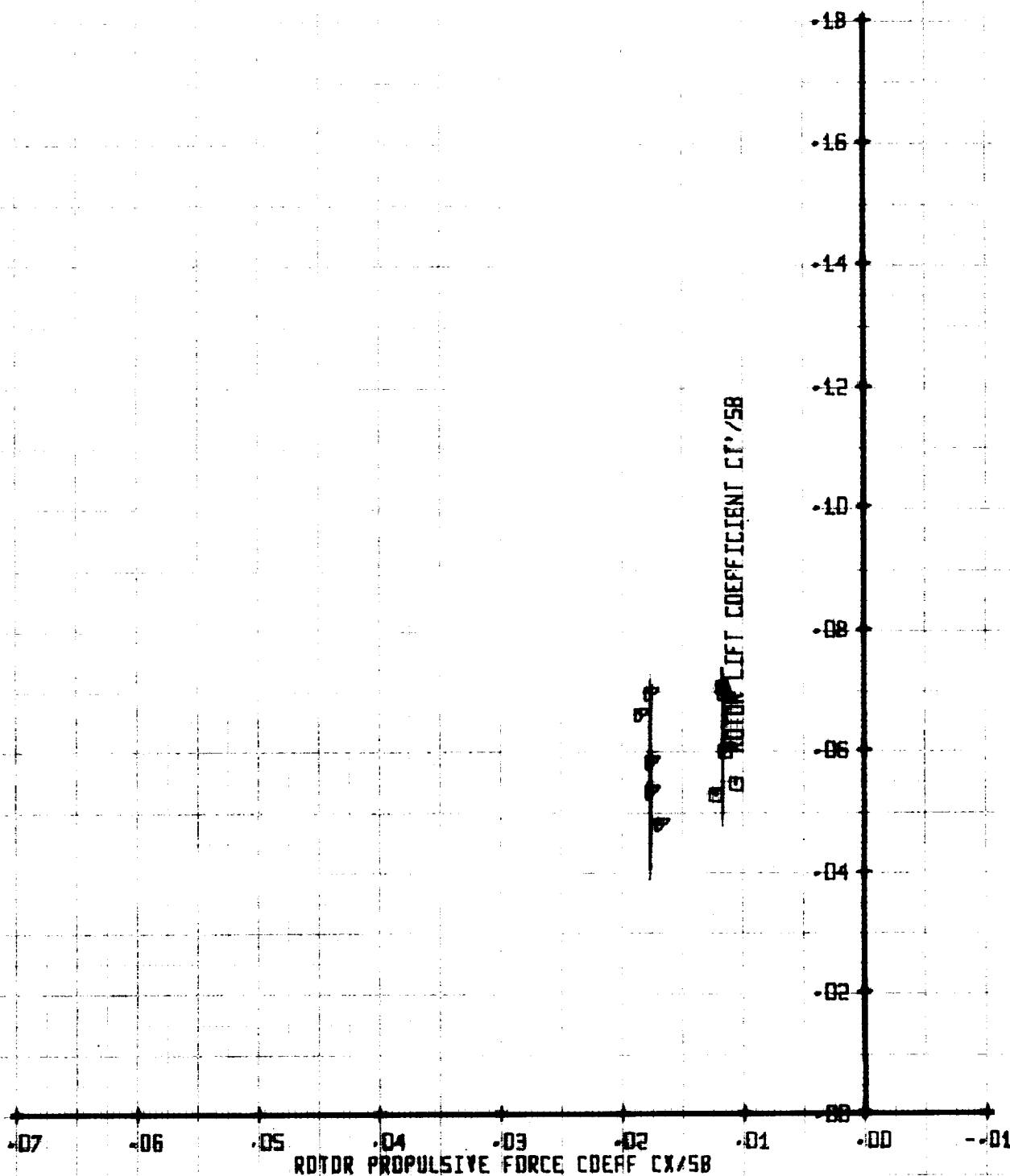
248

.61

.075

378

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PROPULSIVE FORCE COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'
□	229	.61
○	248	.61

X/00258	Y/TUM
.05	378
.075	378

ROTOR LIFT COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK

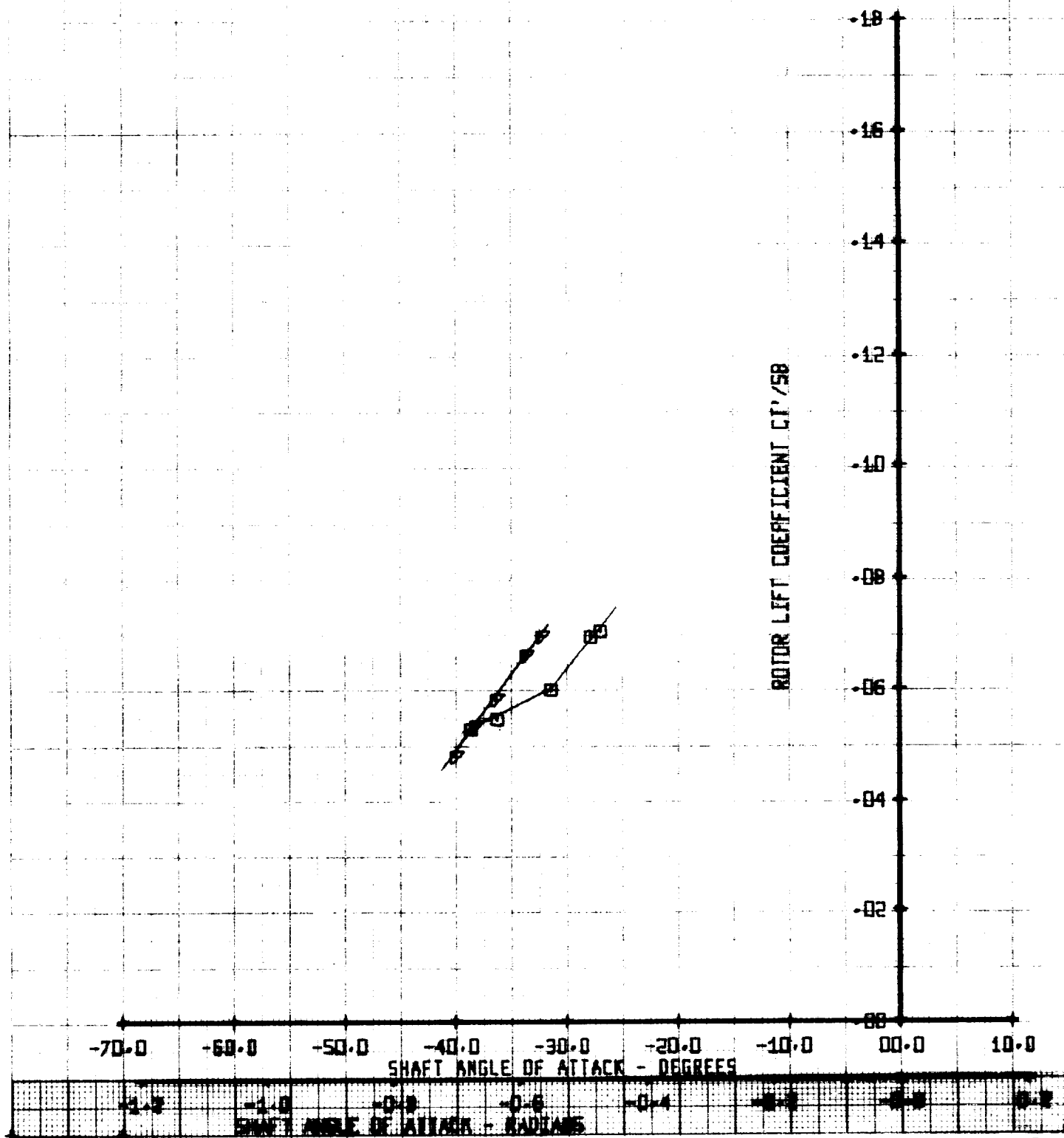


Figure A-251

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM
0
9

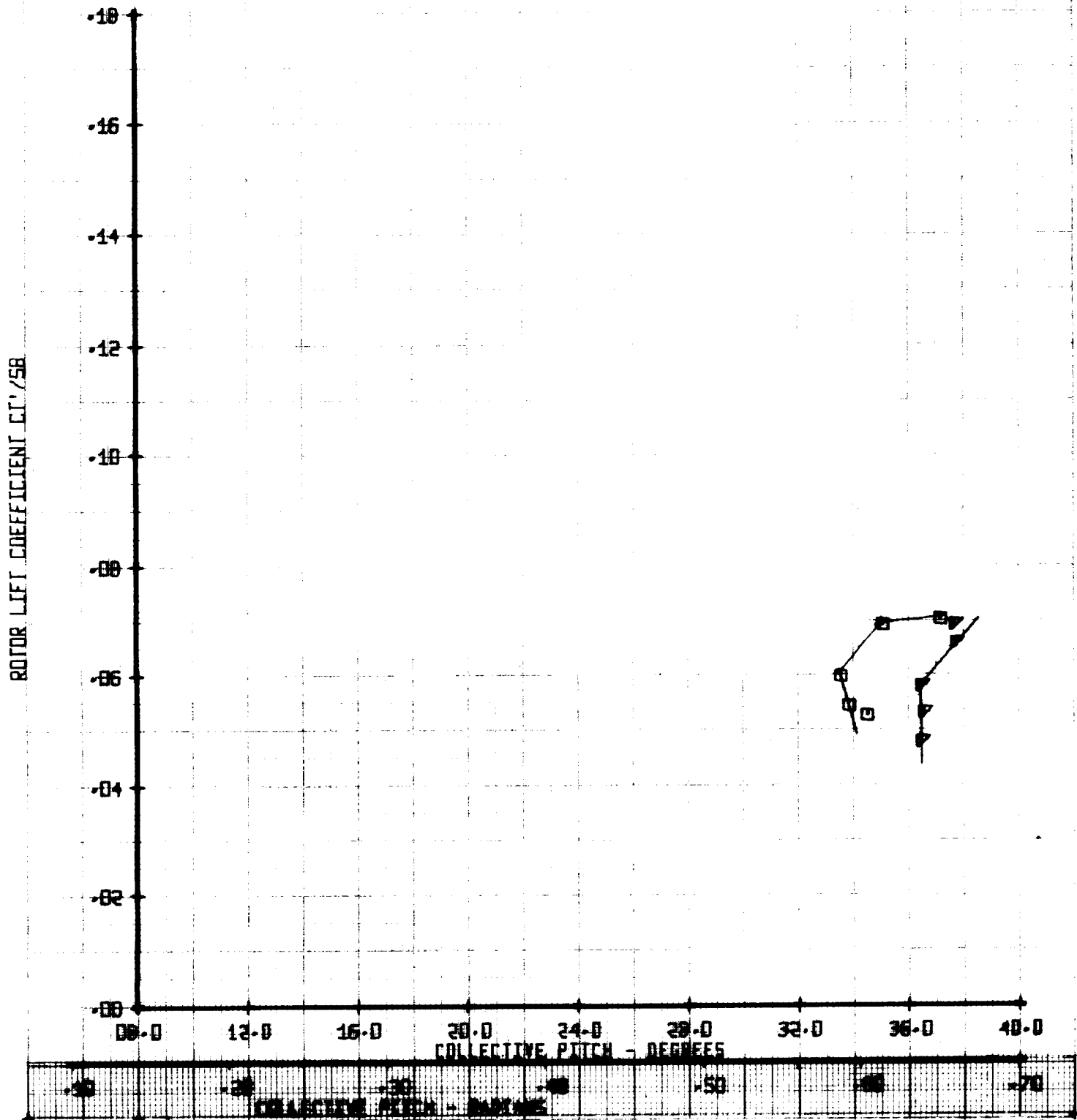
RUN
229
248

MU'
.61
.61

X/DD258
.05
.075

YTUN
378
378

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH

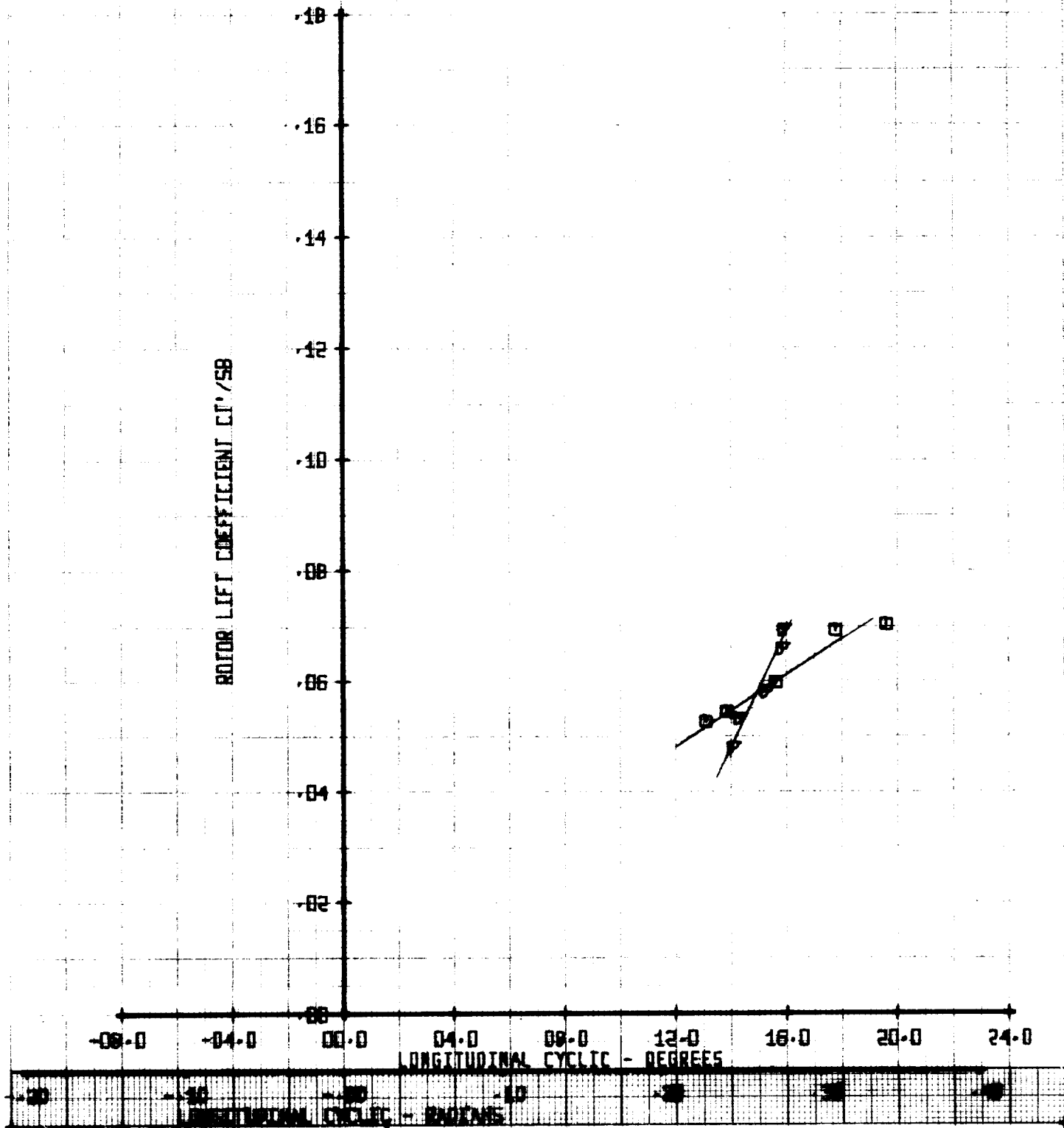


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/CD258	YTUN
0	229	.61	.05	378
7	248	.61	.075	378

ROTOR LIFT COEFFICIENT
VERSUS
LONGITUDINAL CYCLIC



SET 39
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM
□
▽

RUN
229
248

MU'
.61
.61

X/00258
.05
.075

YTUN
378
378

ROTOR LIFE COEFFICIENT
VERSUS
LATERAL CYCLIC

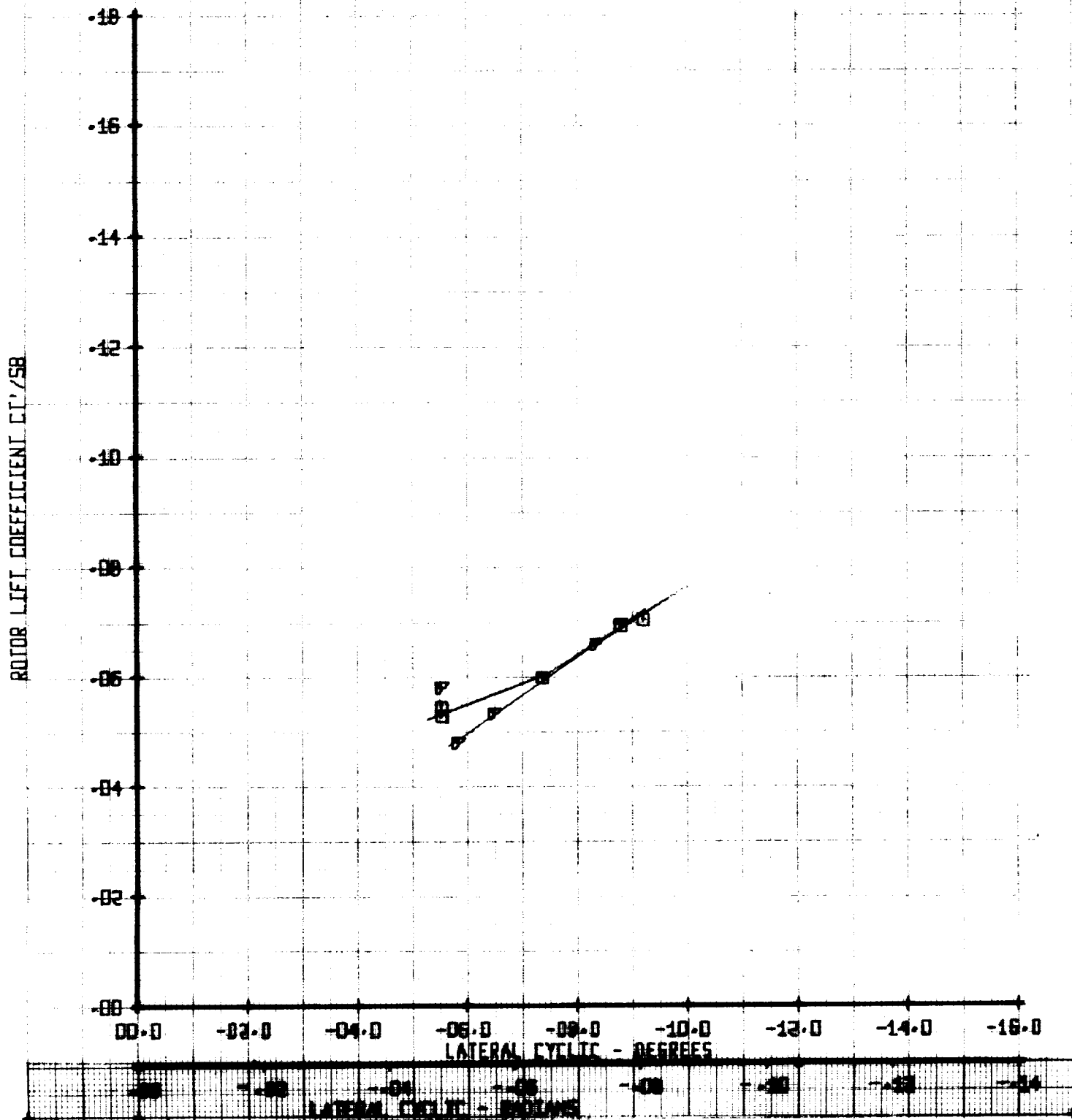


Figure A-254

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DD258	VTUN
□	229	.61	.05	378
▽	248	.61	.075	378

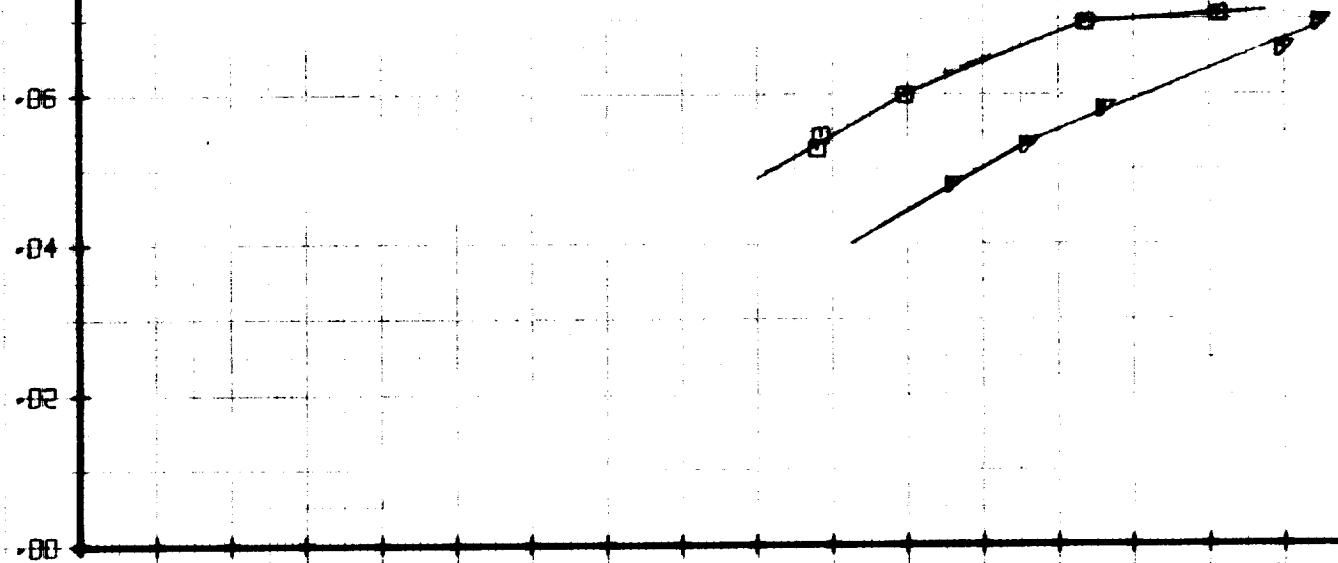
ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT

ROTOR LIFT COEFFICIENT C_L'/SB

0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00

ROTOR POWER COEFFICIENT CP'/SB

0.002 0.004 0.006 0.008 0.010 0.012 0.014 0.016 0.018 0.020 0.022 0.024 0.026 0.028 0.030 0.032 0.034 0.036



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'
0	229	.61
7	248	.61

X/100250	VTUN
.05	378
.075	378

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT

$V_{tip} = 620 \text{ FPS}$

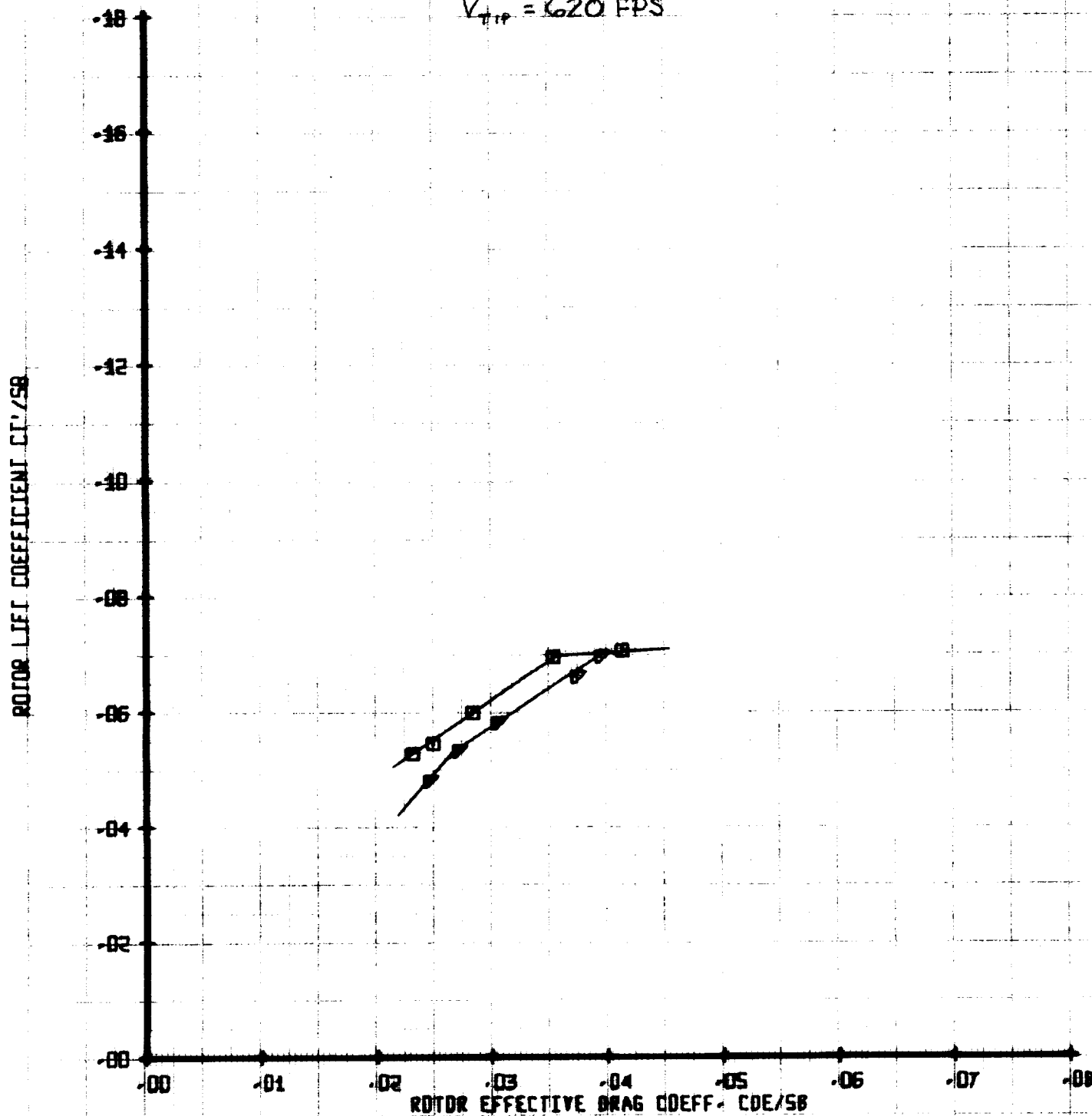


Figure A-256

LIFT-PROPULSIVE FORCE LIMIT TEST

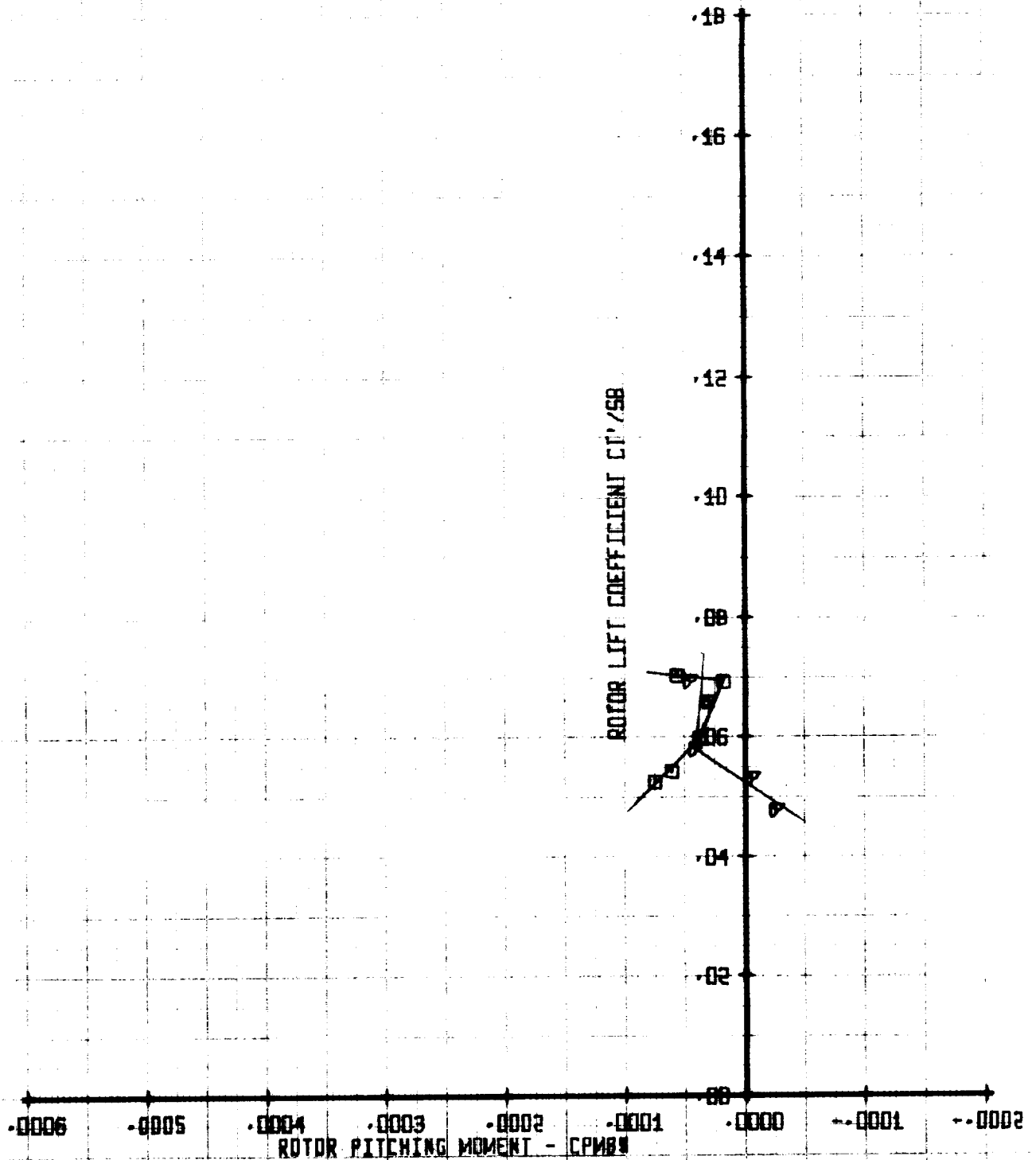
1/10 SCALE OH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML	X/00258	VTUN
□	229	.61	.05	378
△	248	.61	.075	378

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

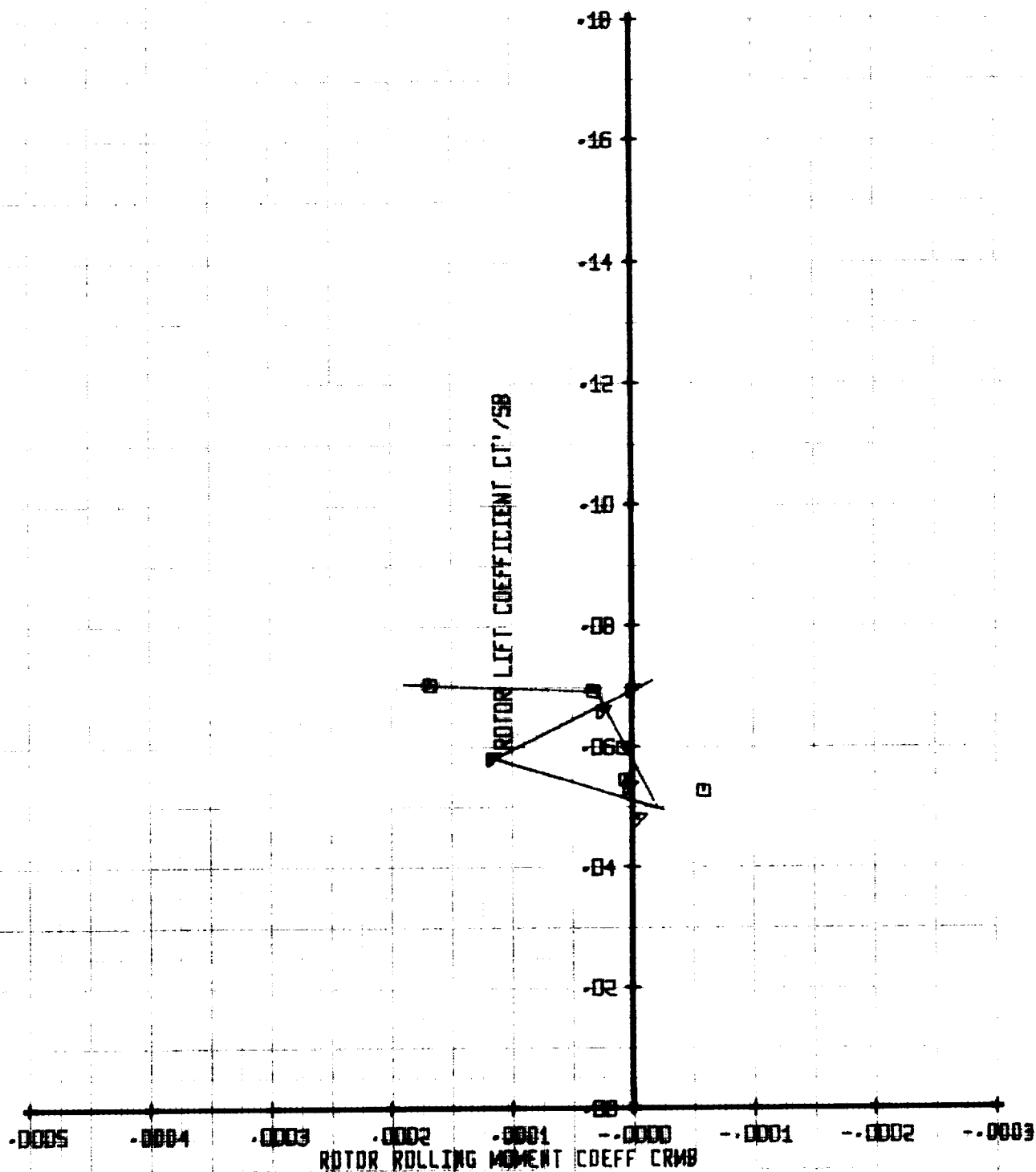


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	Y/TUN
□	229	.61	.05	378
△	248	.61	.075	378

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	229	.61	.05	378
▽	248	.61	.075	378

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT

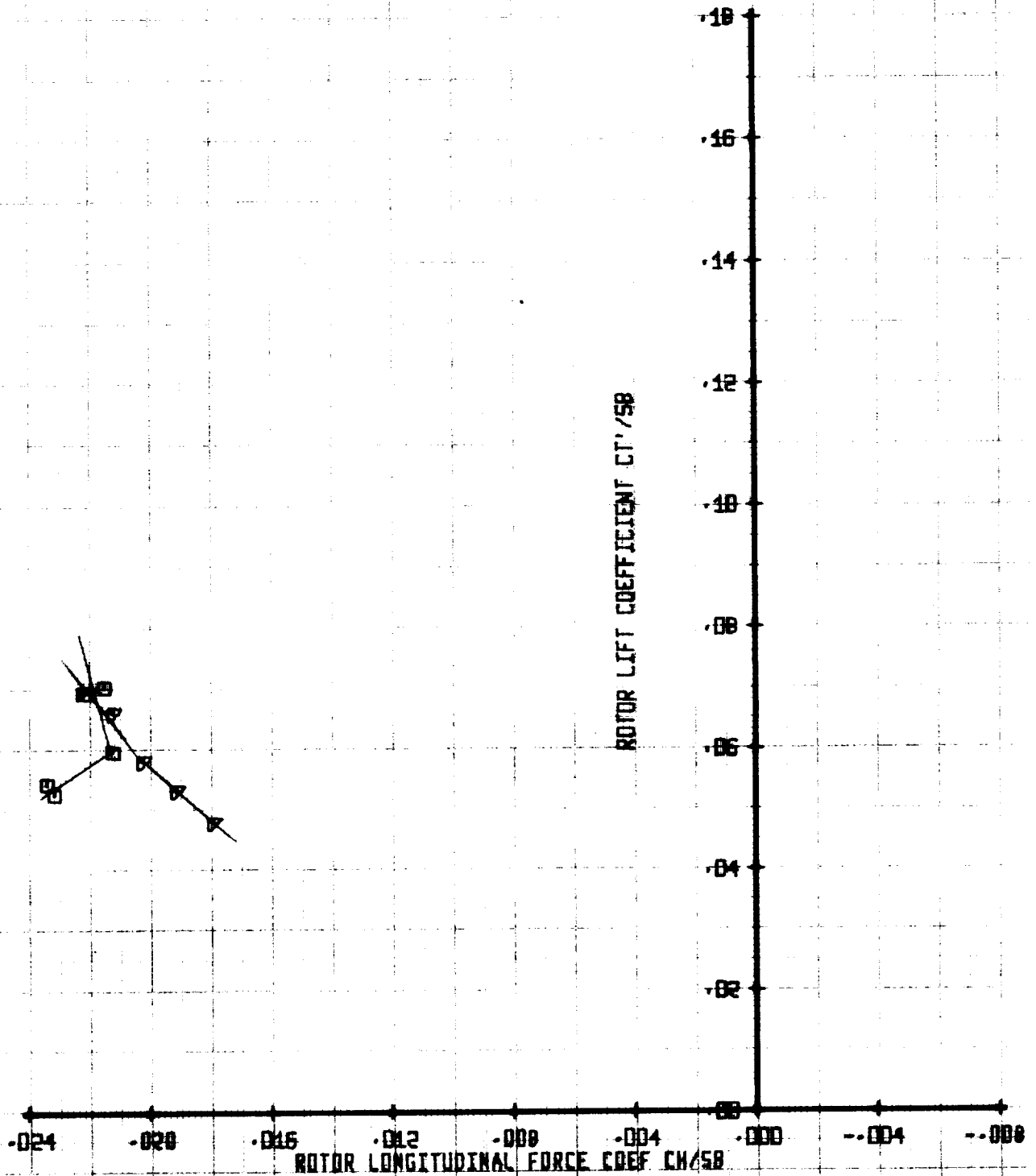


Figure A-259

LIFT-PROPELLIVE FORCE LIMIT TEST

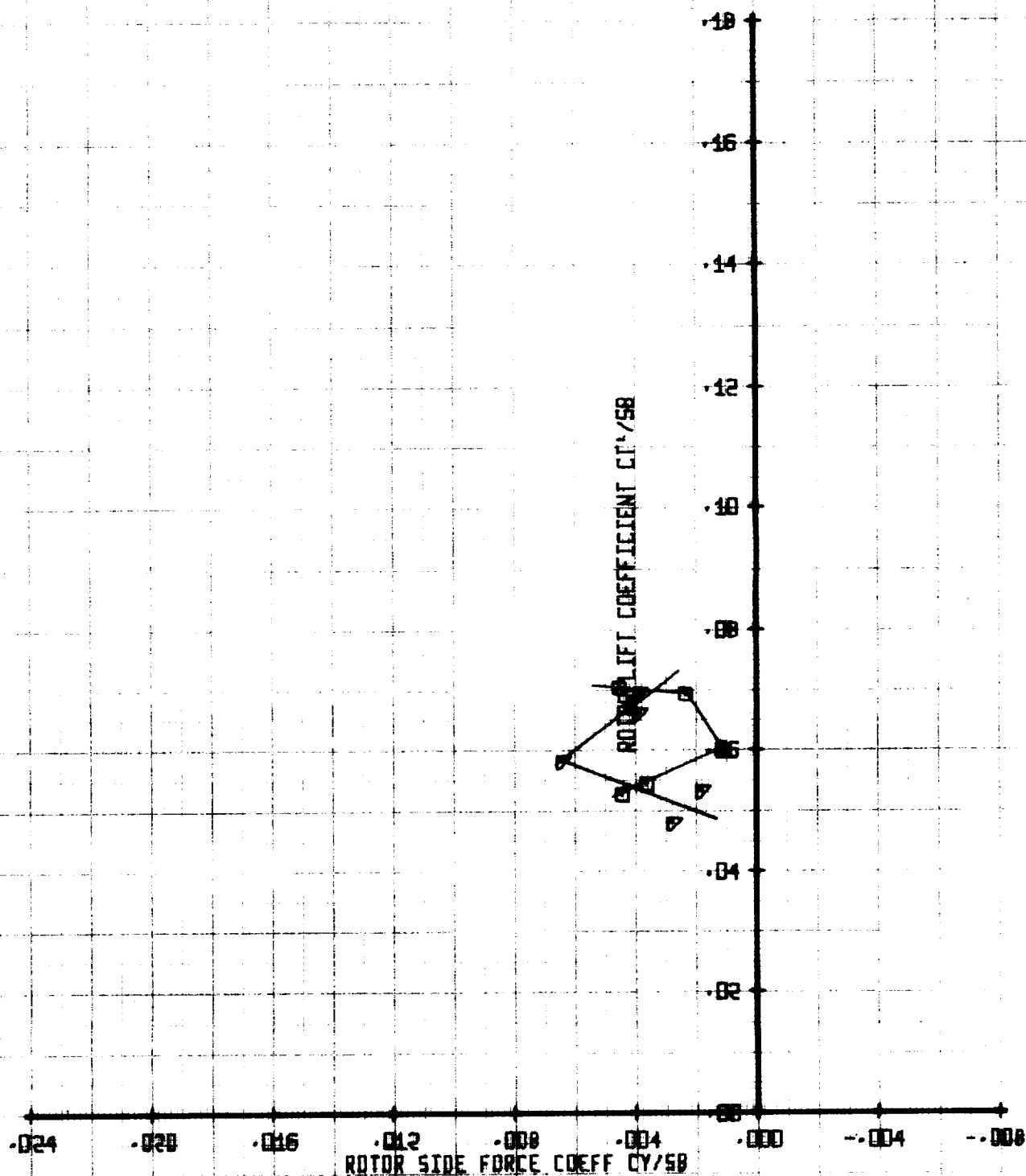
1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	Y/TUN
0	229	.61	.05	370
7	248	.61	.075	370

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT



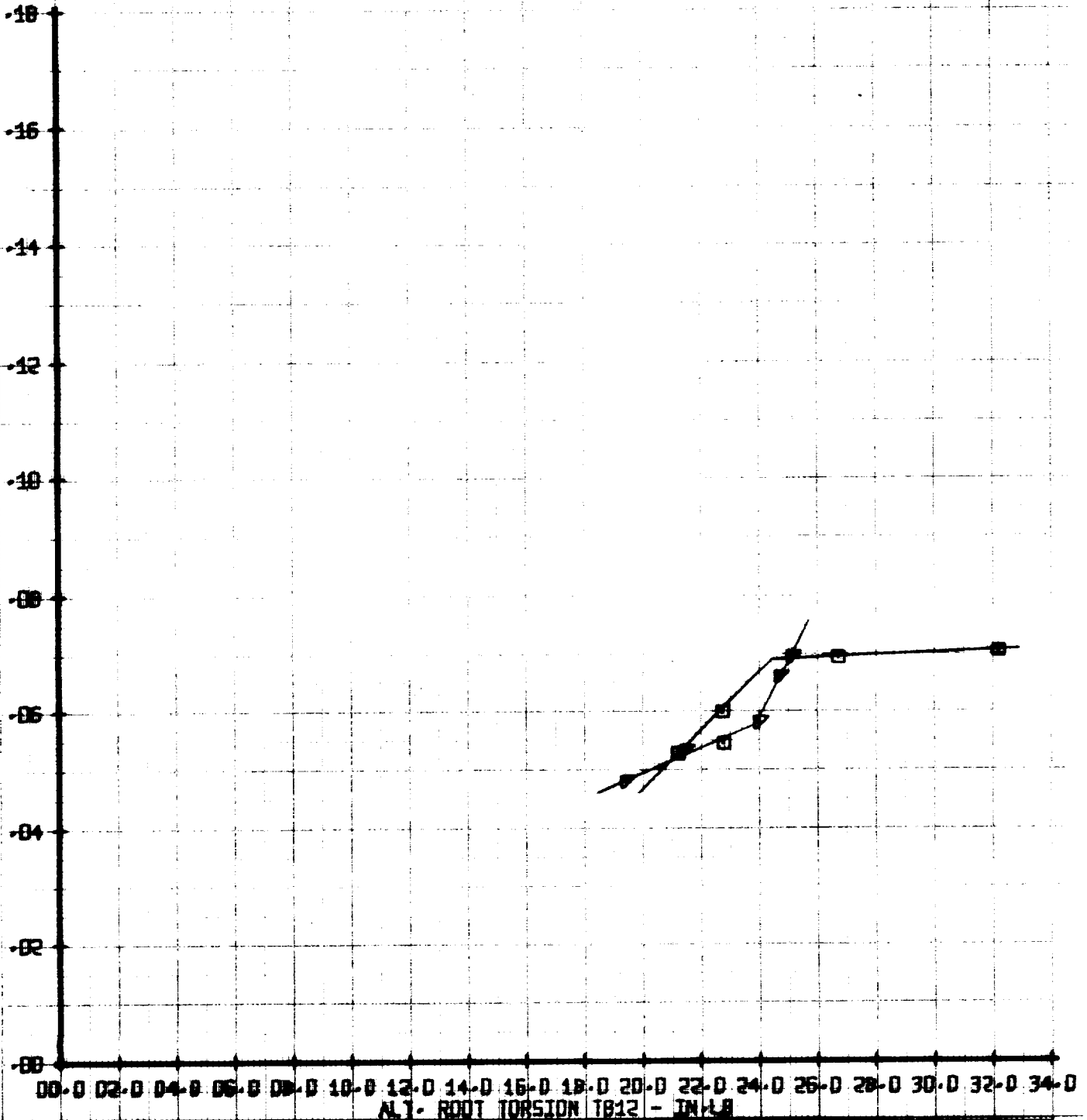
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTUN
□	229	-61	-05	378
▽	248	-61	-075	378

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

ROTOR LIFT COEFFICIENT C_L/SB

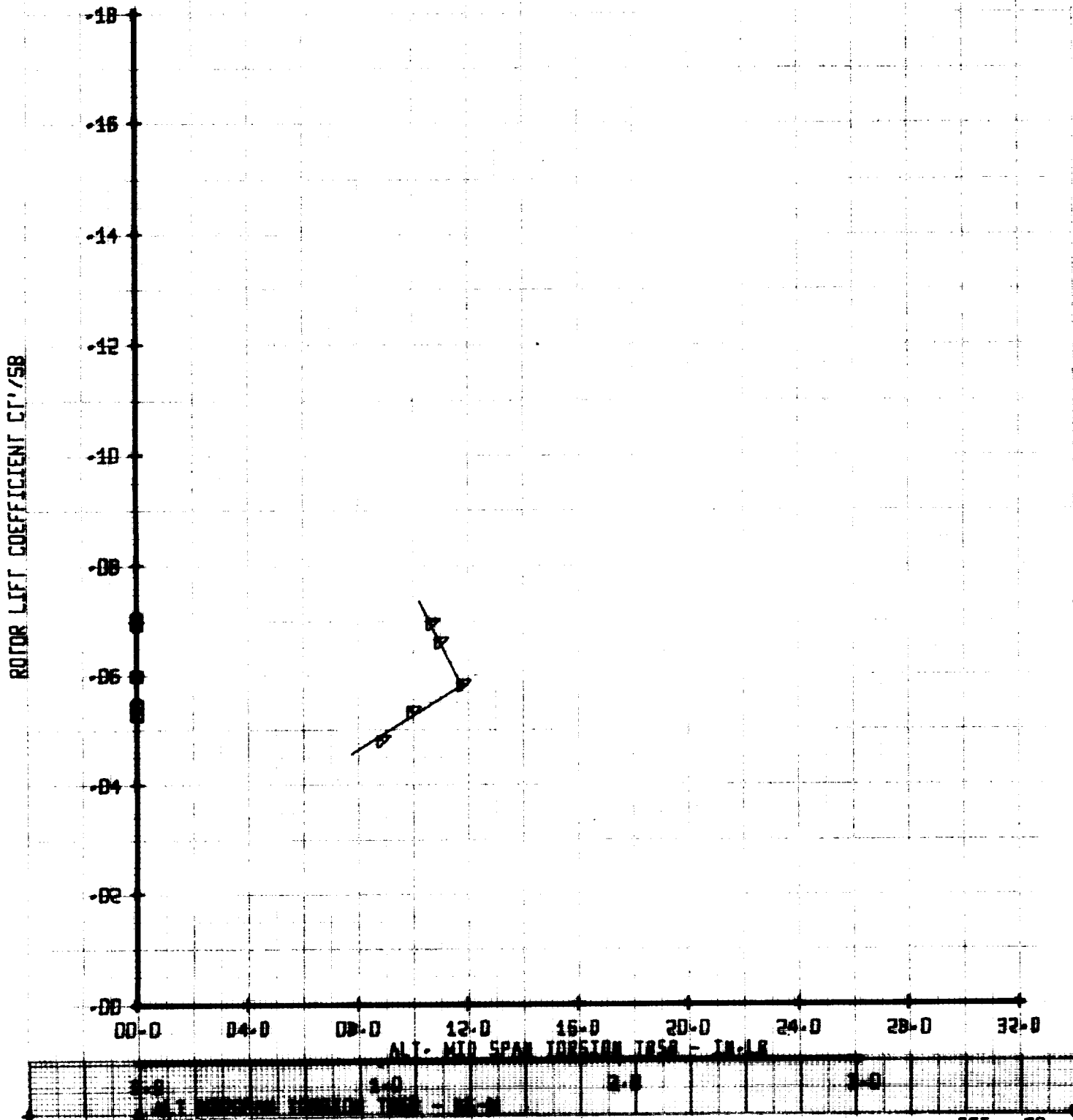


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTUN
0	229	.61	.05	370
7	248	.61	.075	370

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50

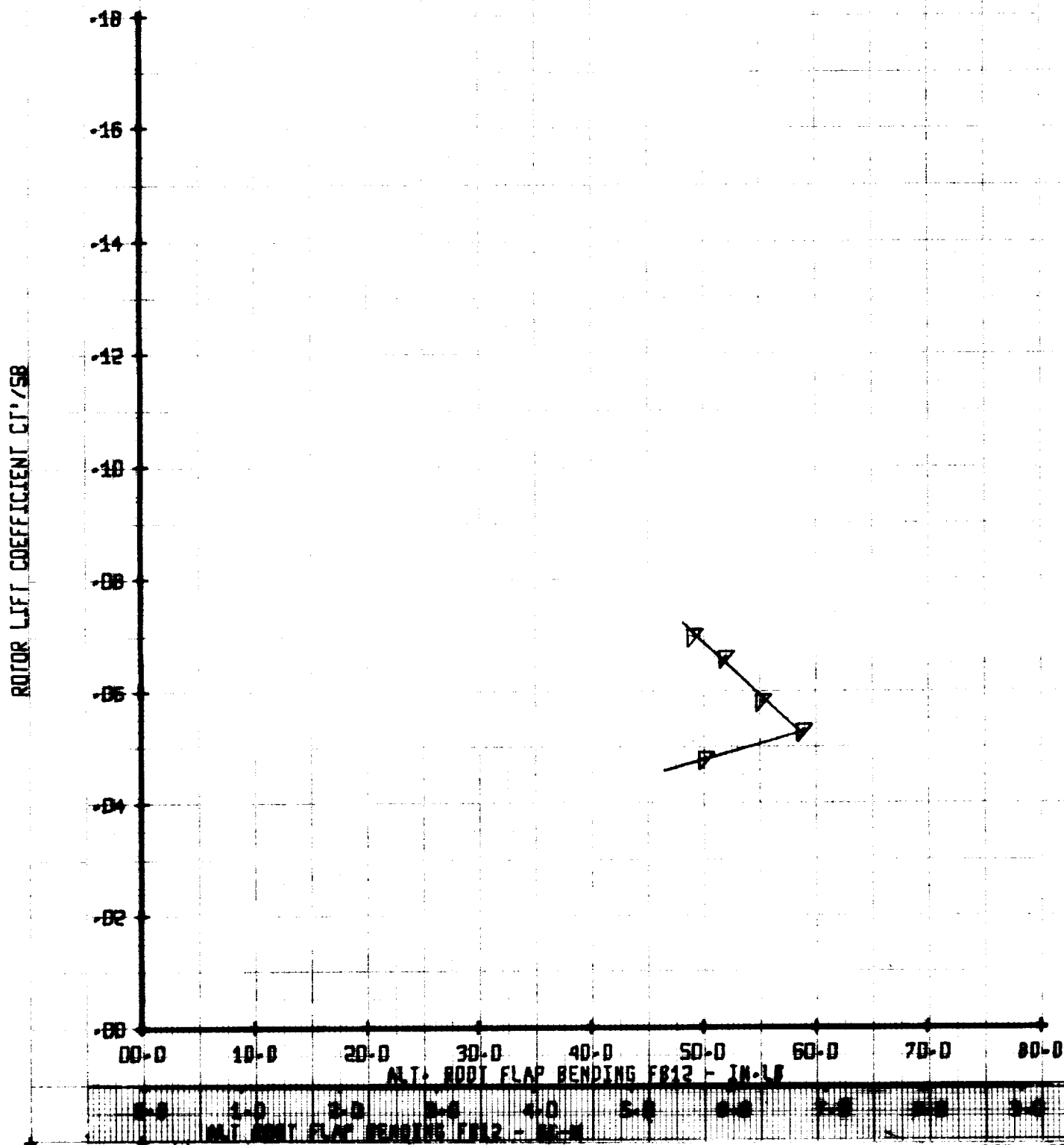


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTUN
0	229	.61	.05	370
7	248	.61	.075	370

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

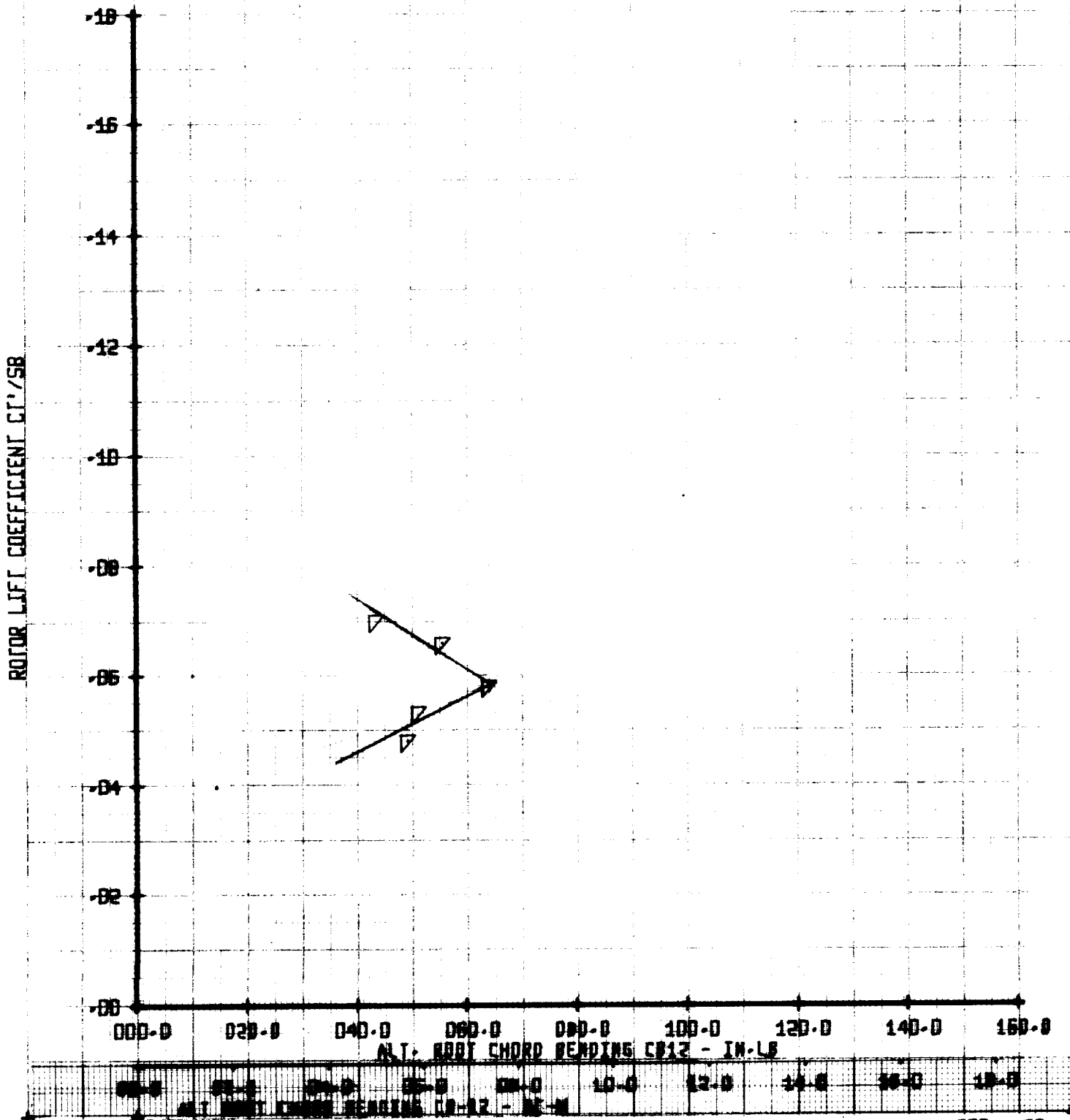


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MLP	X/00258	VTUN
0	229	.61	.05	378
P	248	.61	.075	378

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM
□
▽

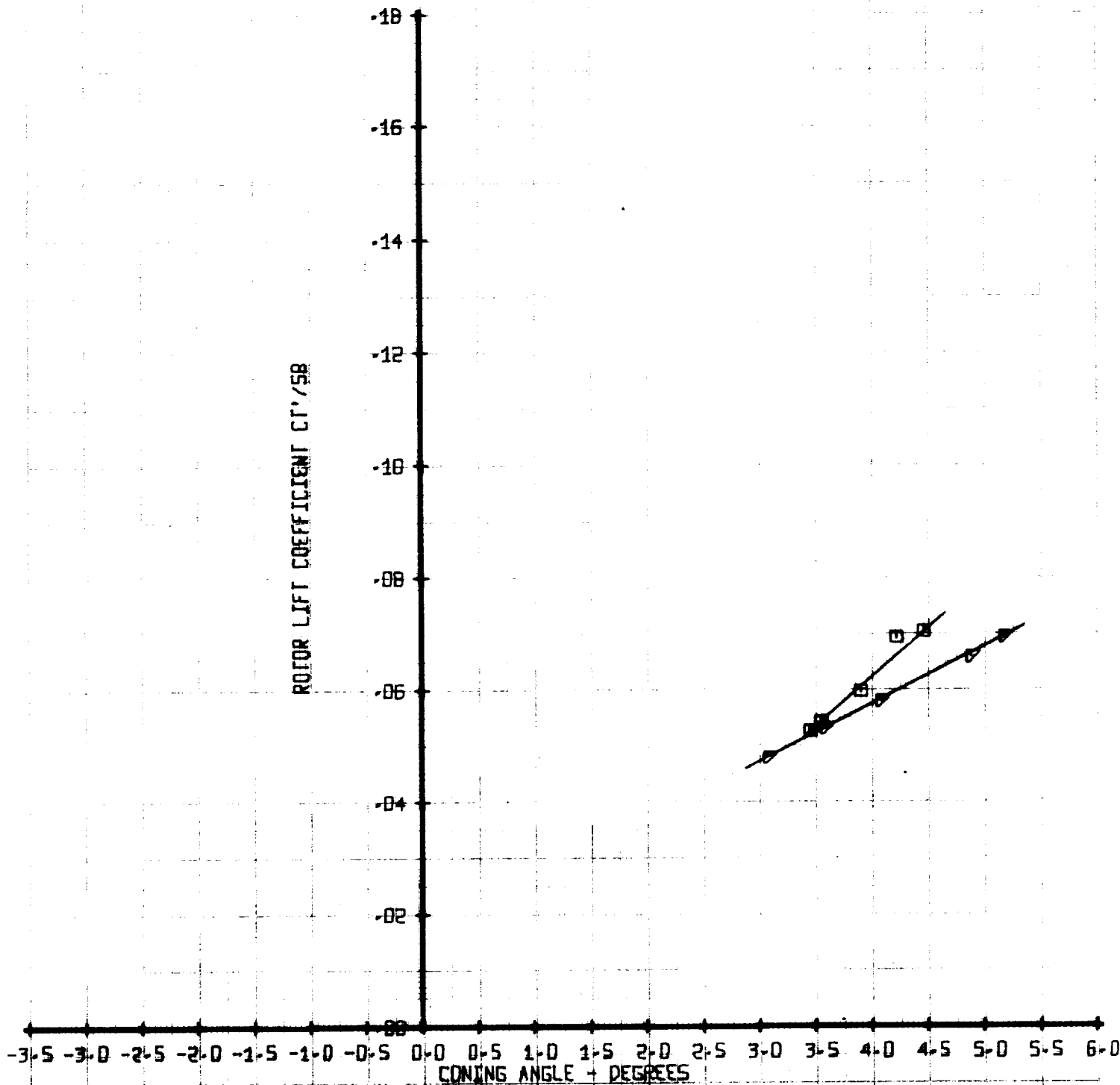
RUN
229
248

MU'
-61
-61

X/QD25B
-05
-075

VTUN
37B
37B

ROTOR LIFT COEFFICIENT
VERSUS
CONING ANGLE



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM
 0
 8

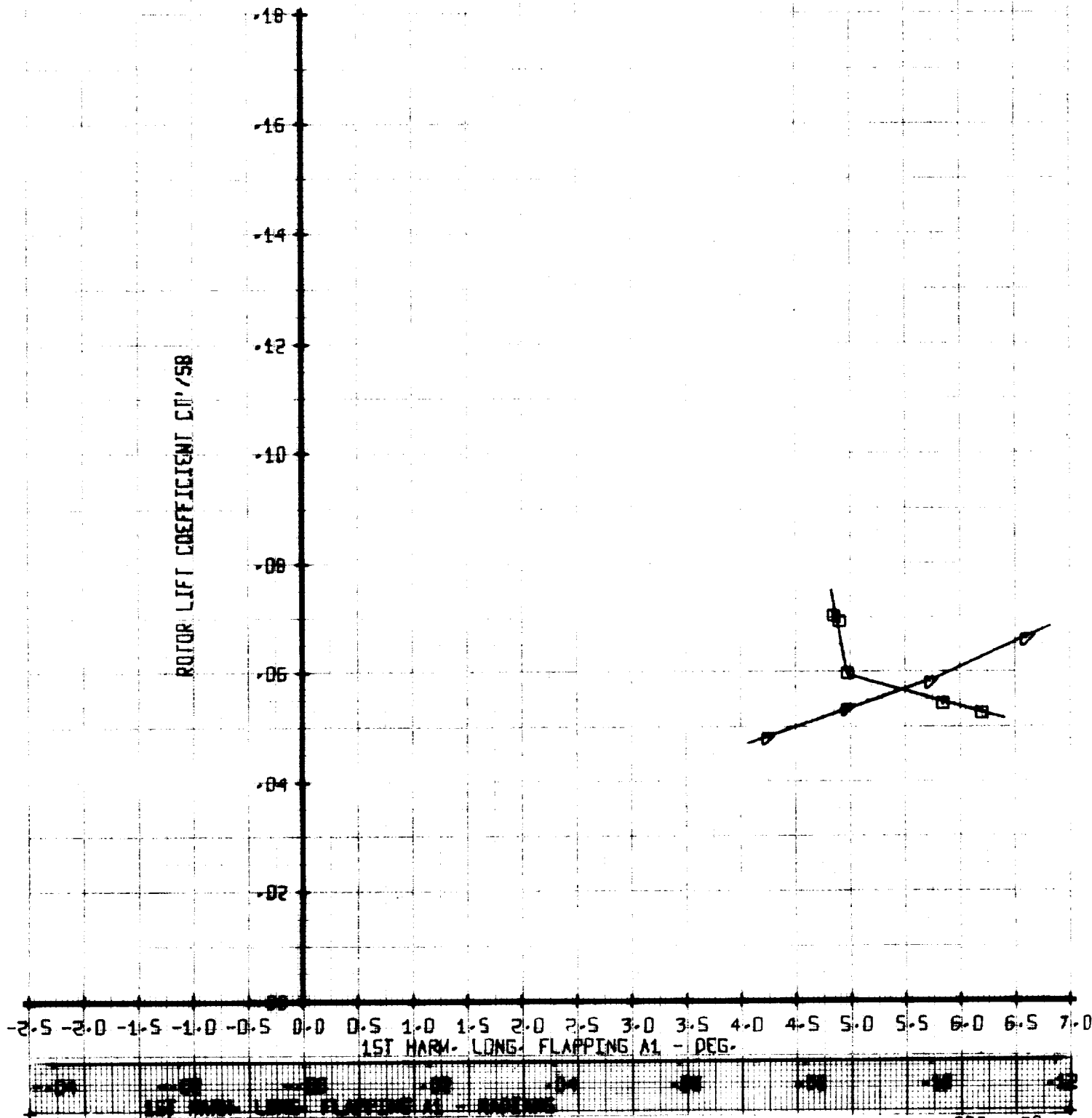
RUN
 229
 248

MU'
 .61
 .61

X/OD258
 .05
 .075

YTUN
 37B
 37B

ROTOR LIFT COEFFICIENT
 VERSUS
 1ST HARMONIC LONGITUDINAL FLAPPING A1



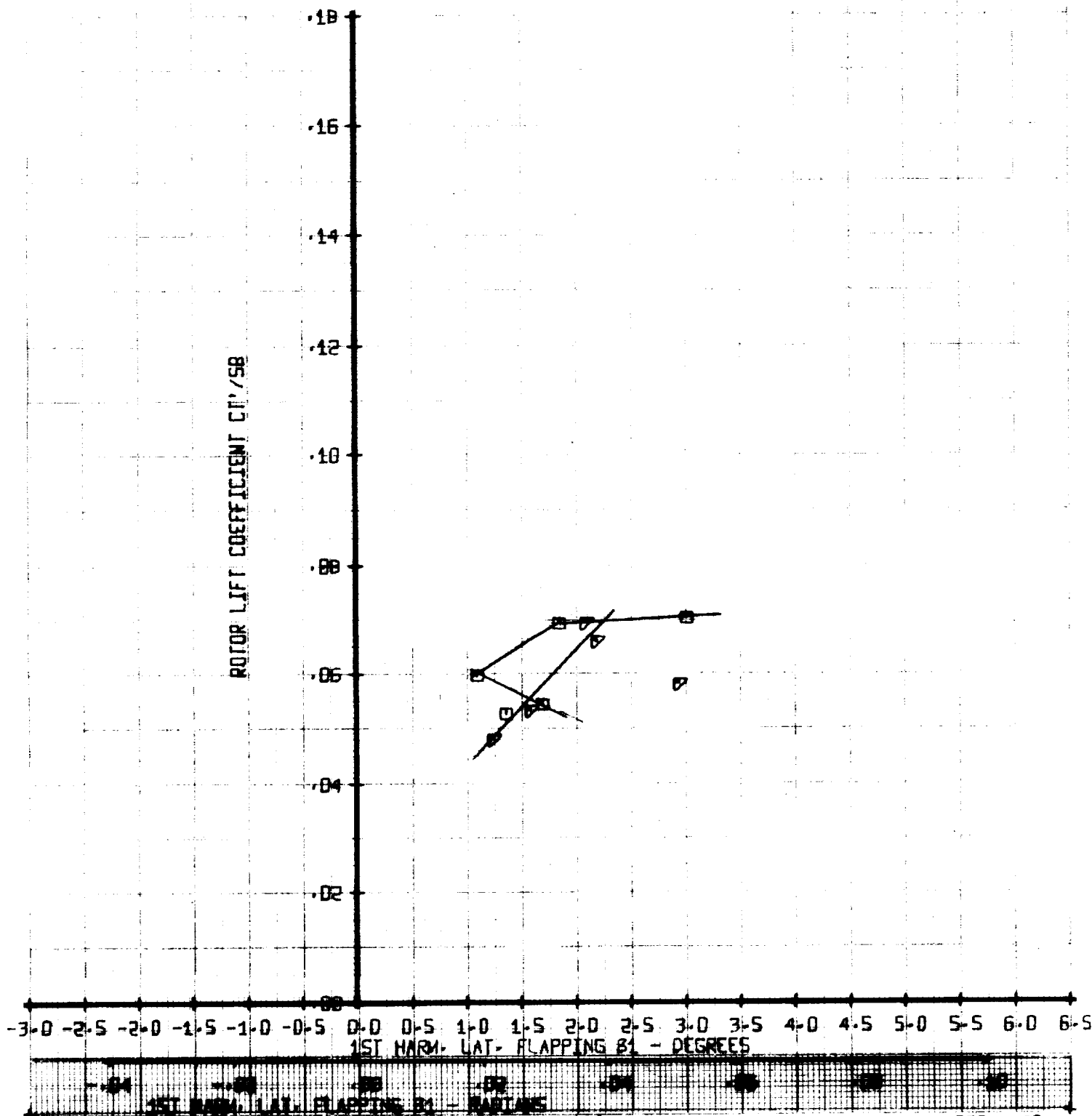
SET 39
 BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/QD258	YILIN
□	229	.61	.05	37B
▽	248	.61	.075	37B

ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1



SET 39
BVWT 193

Figure A-267

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	229	.61	.05	37B
△	248	.61	.075	37B

ROTOR LIFT COEFFICIENT
VERSUS

ALTERNATING LEAD-LAG ANGLE

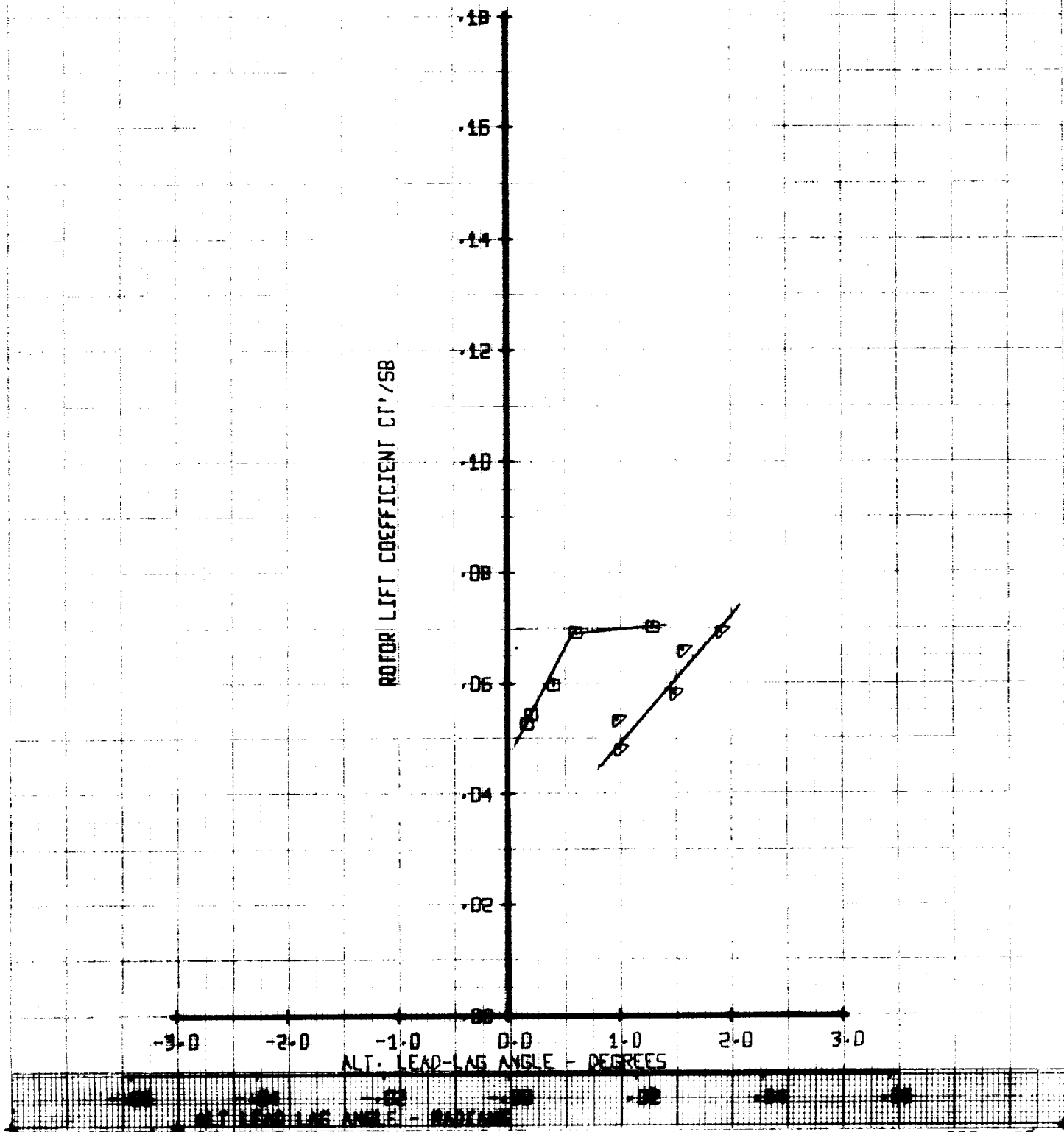


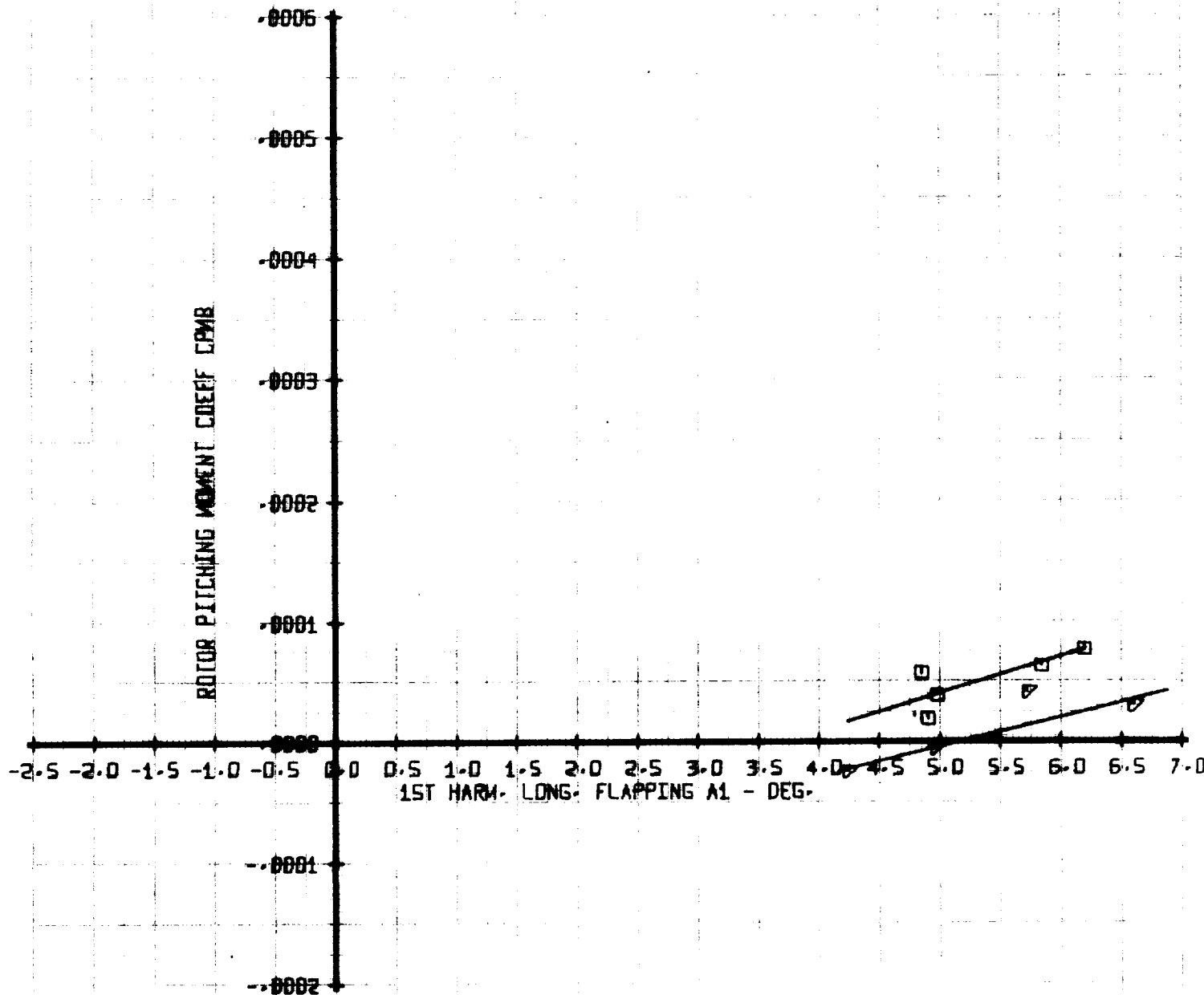
Figure A-268

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/OD258	Y/TUN
□	229	.61	.05	37B
△	248	.61	.075	37B

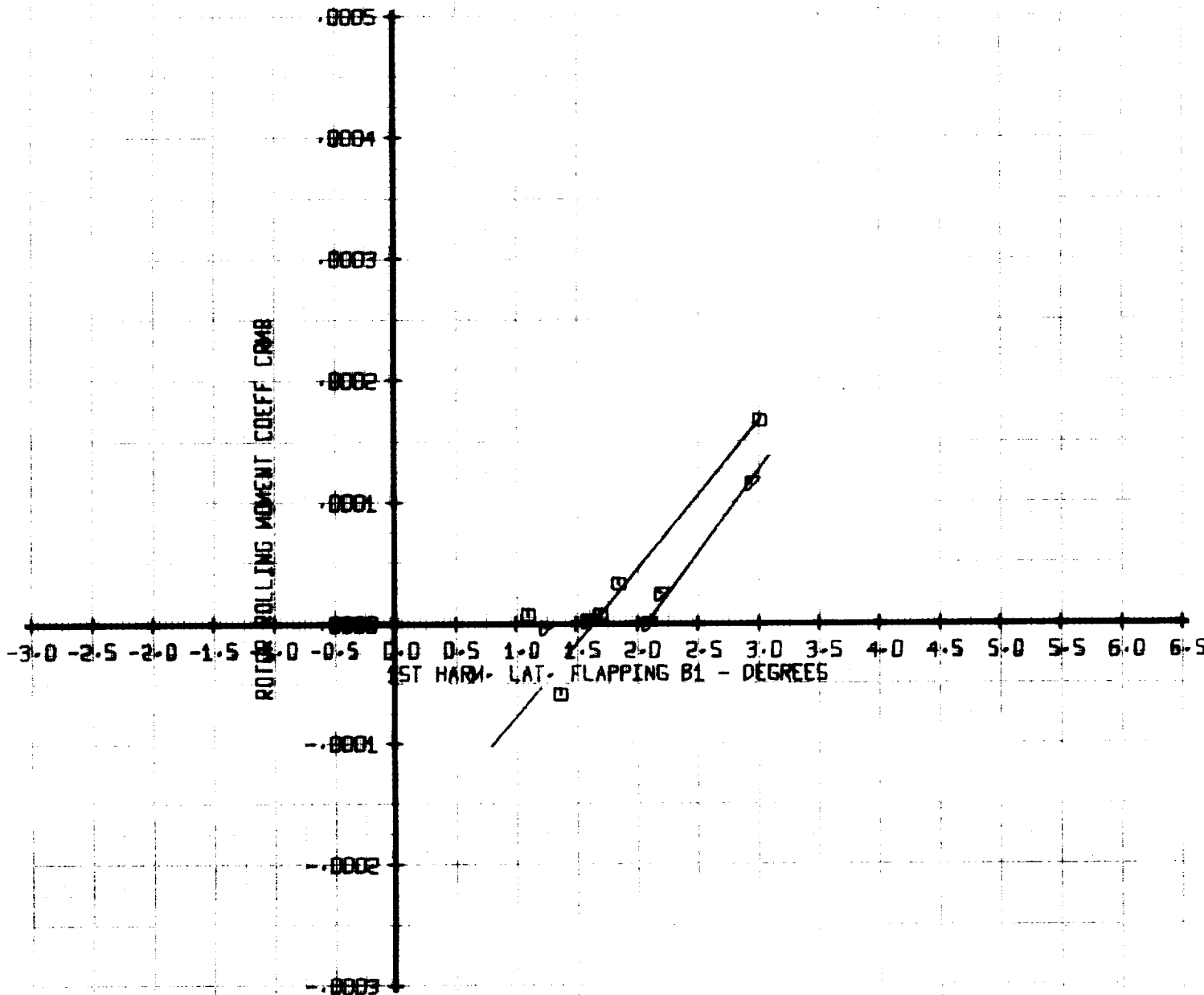
ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND				
SYM	RUN	MU'	X/00258	YTUN
□	229	.61	.05	37B
▽	248	.61	.075	37B

ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1



LIFT-PROPULSIVE FORCE LIMIT TEST

1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	250	.40	.05	228
△	256	.40	.05	228

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PROPULSIVE FORCE COEFFICIENT
REDUCED TIP SPEED

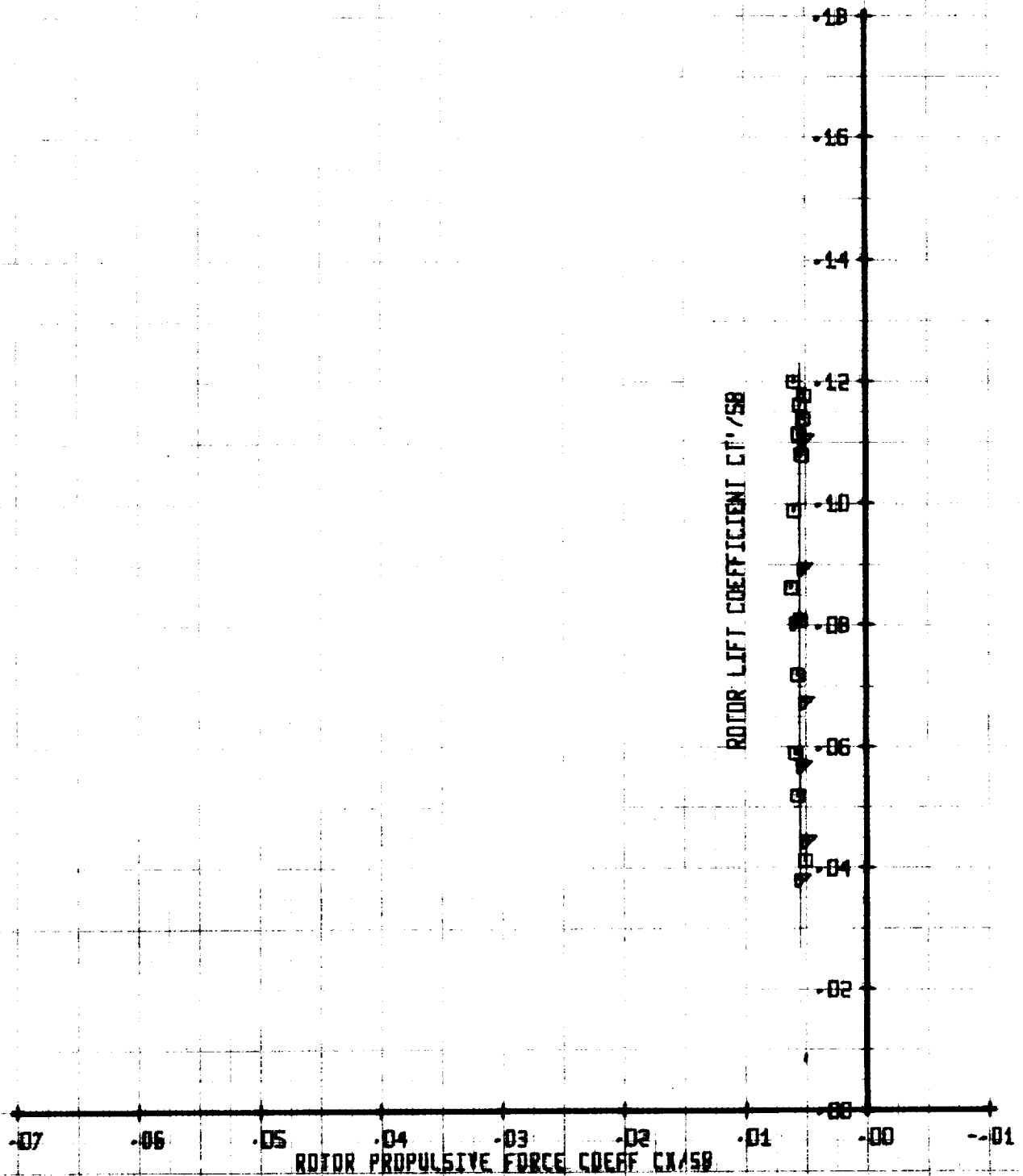


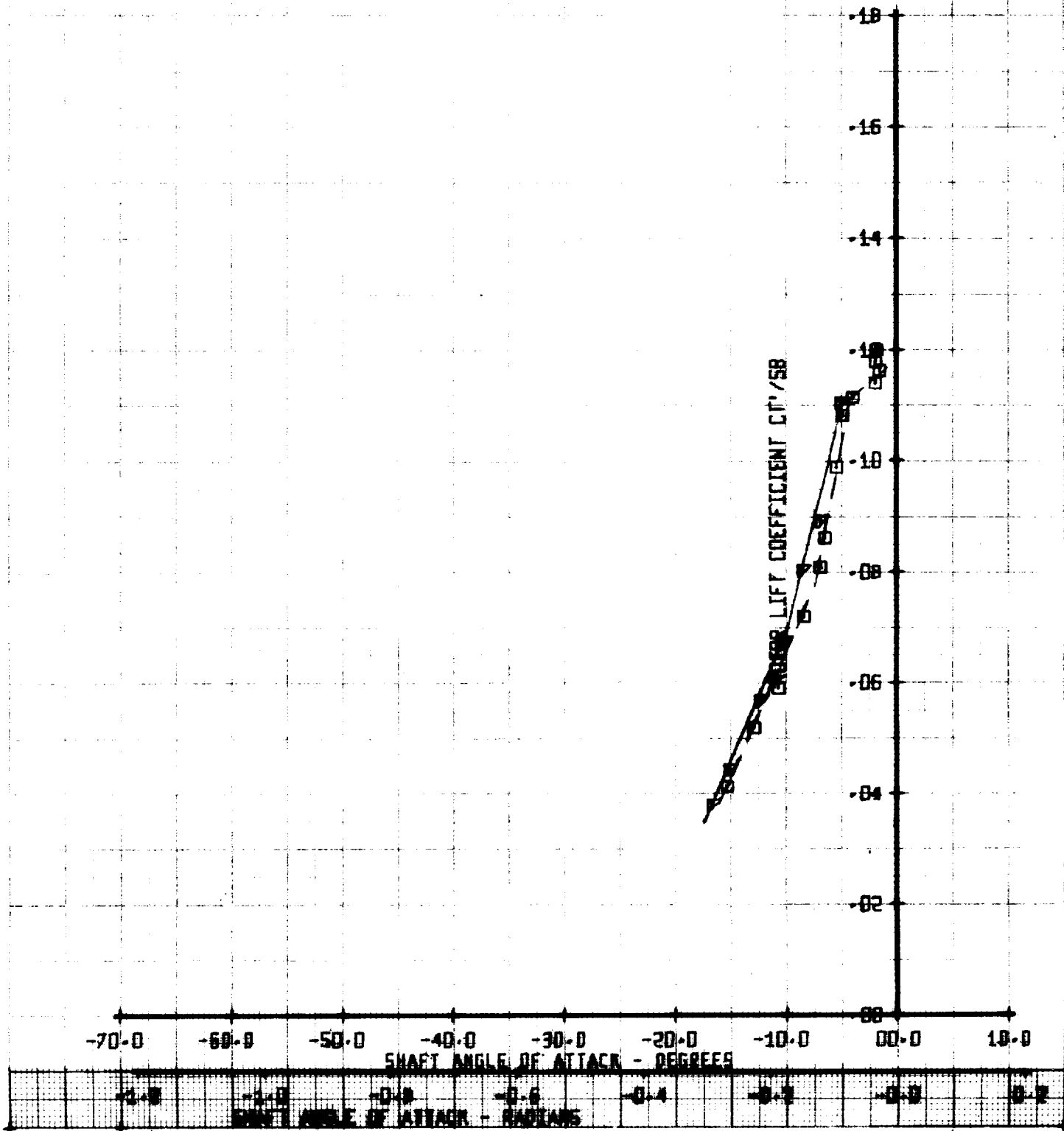
Figure A-271

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	YTUN
□	250	.40	.05	220
△	256	.40	.05	228

ROTOR LIFT COEFFICIENT
 VERSUS
 SHAFT ANGLE OF ATTACK
 REDUCED TIP SPEED



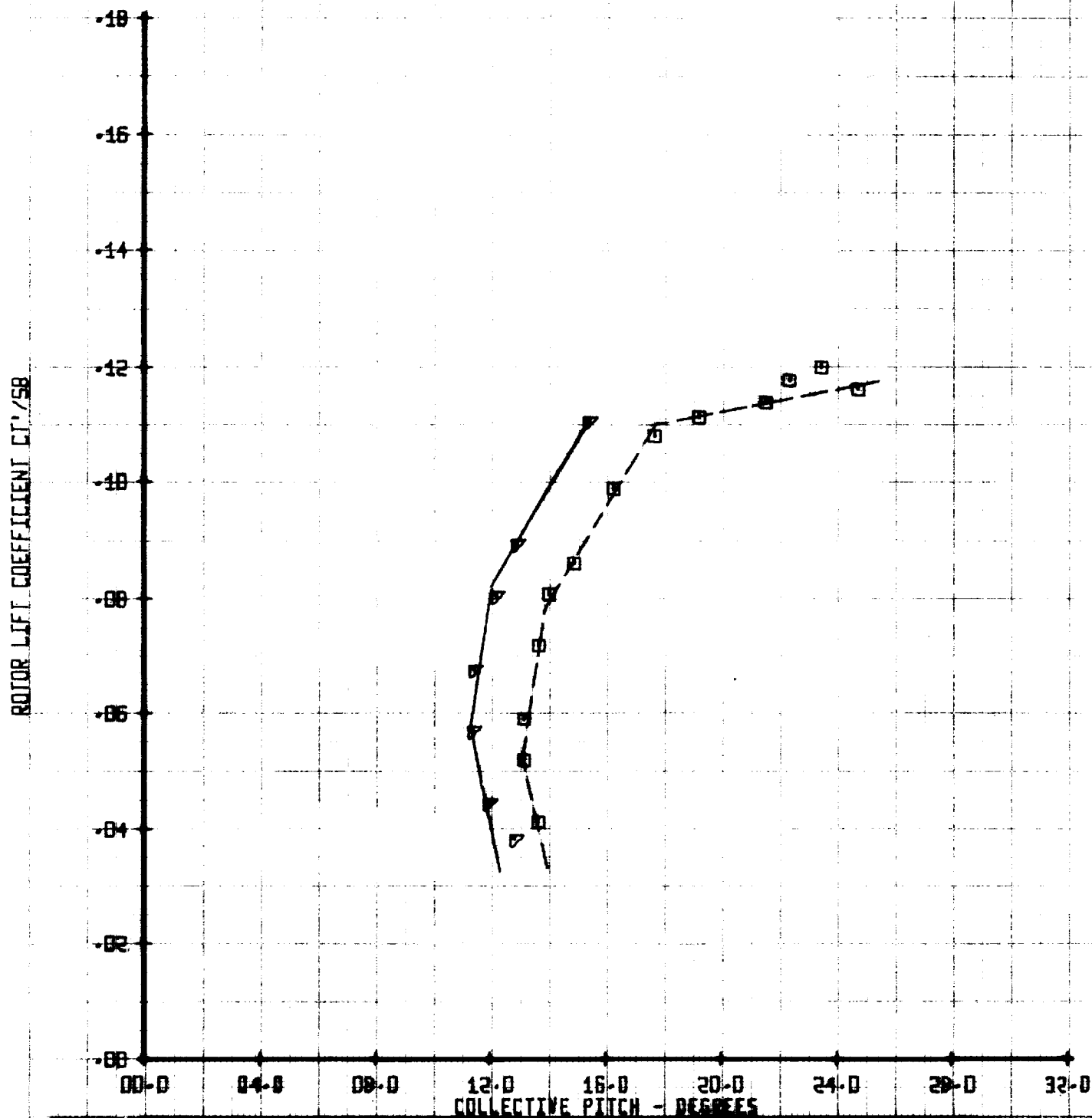
SET 40
 BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47A ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	250	.40	.05	220
▽	256	.40	.05	220

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH
REDUCED TIP SPEED



COLLECTIVE PITCH - DEGREES

SET 40
BVWT 193

Figure A-273

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

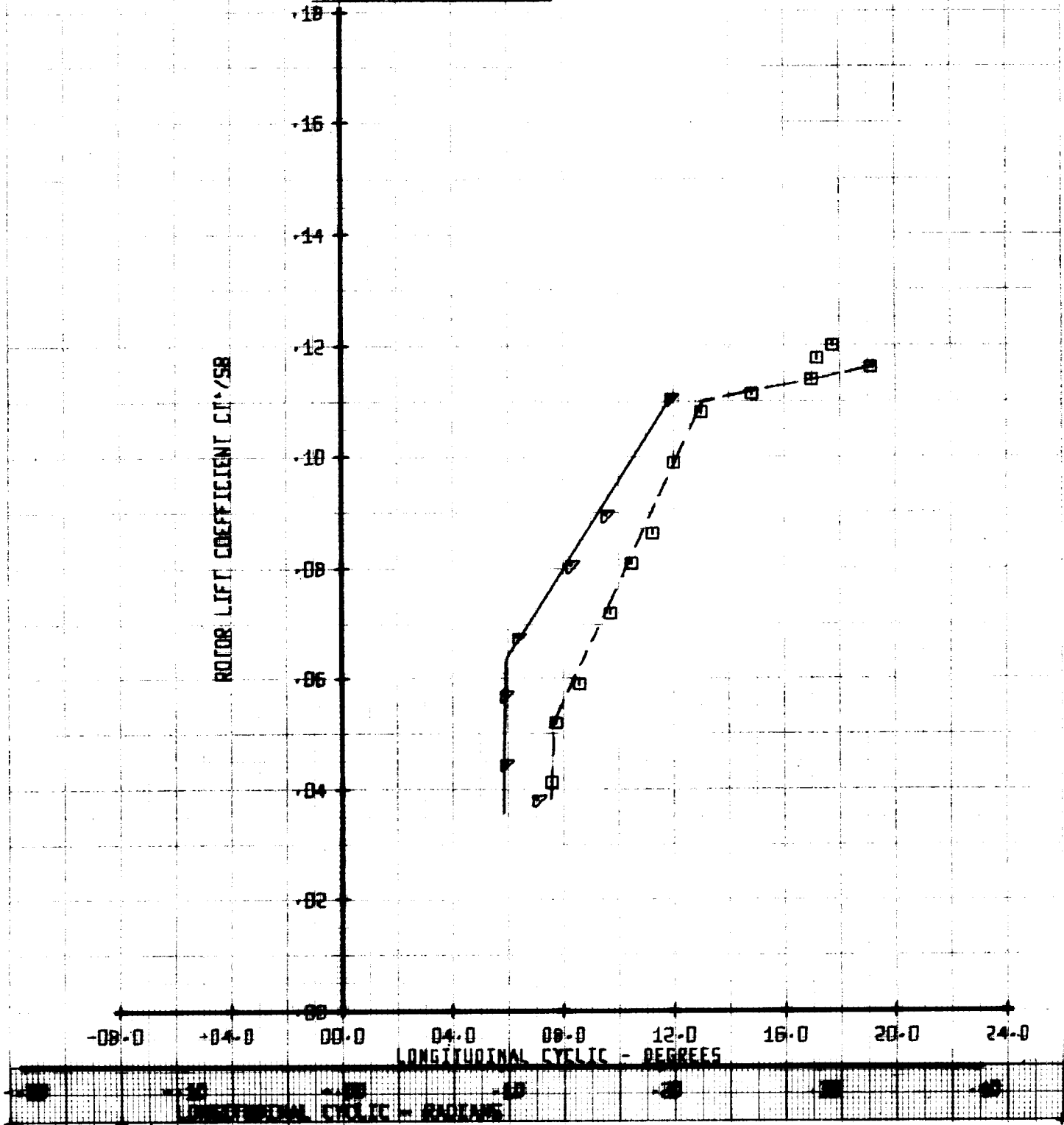
LEGEND

SYM	RUN	MU'	X/DD258	YTUN
□	250	.40	.05	228
△	256	.40	.05	228

ROTOR LIFT COEFFICIENT
VERSUS
LONGITUDINAL CYCLIC

REDUCED TIP SPEED

ROTOR LIFT COEFFICIENT $C_L^*/58$



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM
□
△

RUN
250
256

LEGEND

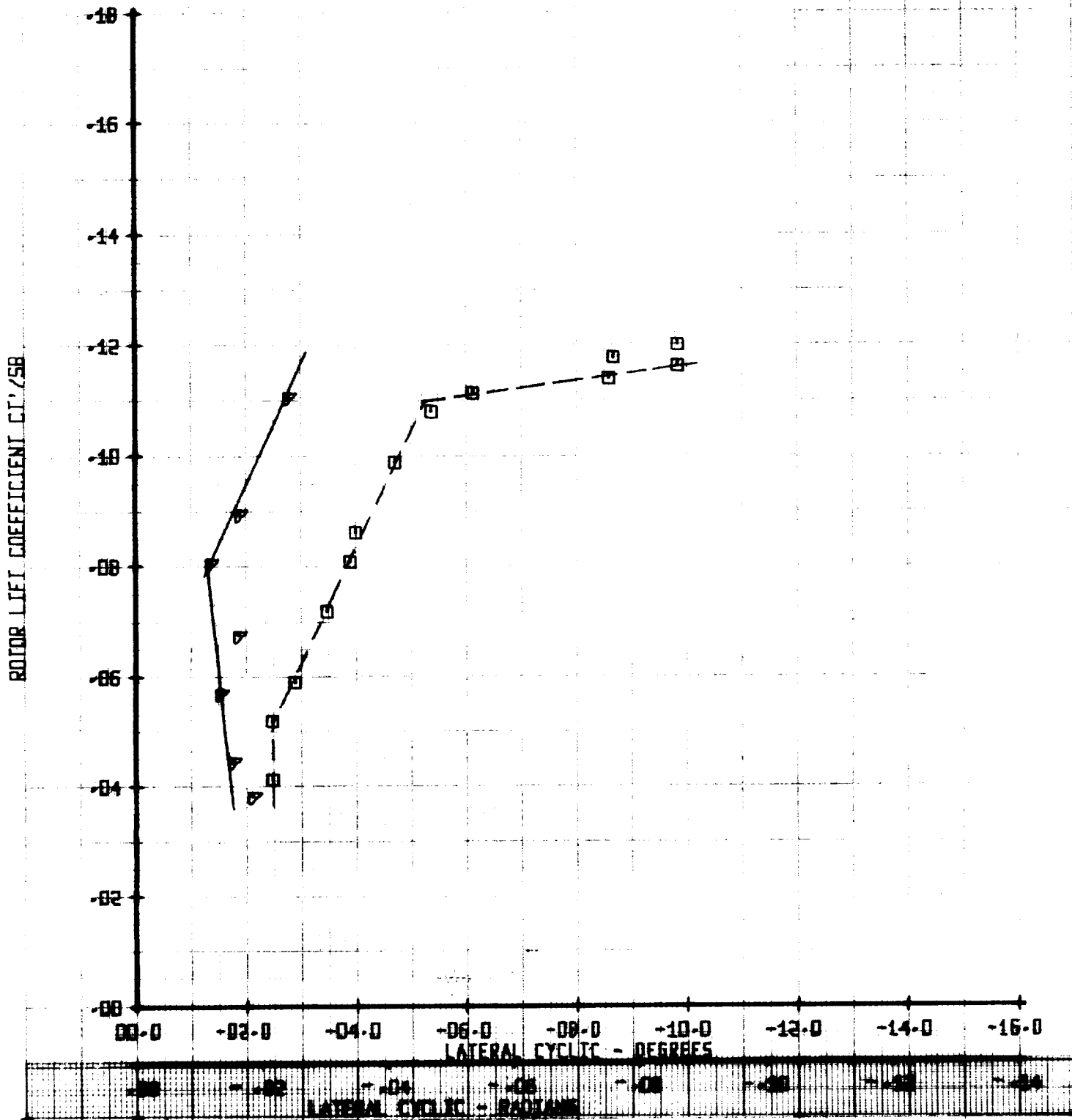
MU'
.40
.40

X/00258
.05
.05

VTUN
238
228

ROTOR LIFT COEFFICIENT
VERSUS
LATERAL CYCLIC

REDUCED TIP SPEED



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM
0
A

RUN
250
256

LEGEND

MI'
.40
.40

X/00258
.05
.05

VTUM
230
220

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT

REDUCED TIP SPEED

ROTOR LIFT COEFFICIENT $C_L'/58$

.18
.16
.14
.12
.10
.08
.06
.04
.02
.00

.002 .004 .006 .008 .010 .012 .014 .016 .018 .020 .022 .024 .026 .028 .030 .032 .034 .036

ROTOR POWER COEFFICIENT $C_P'/58$

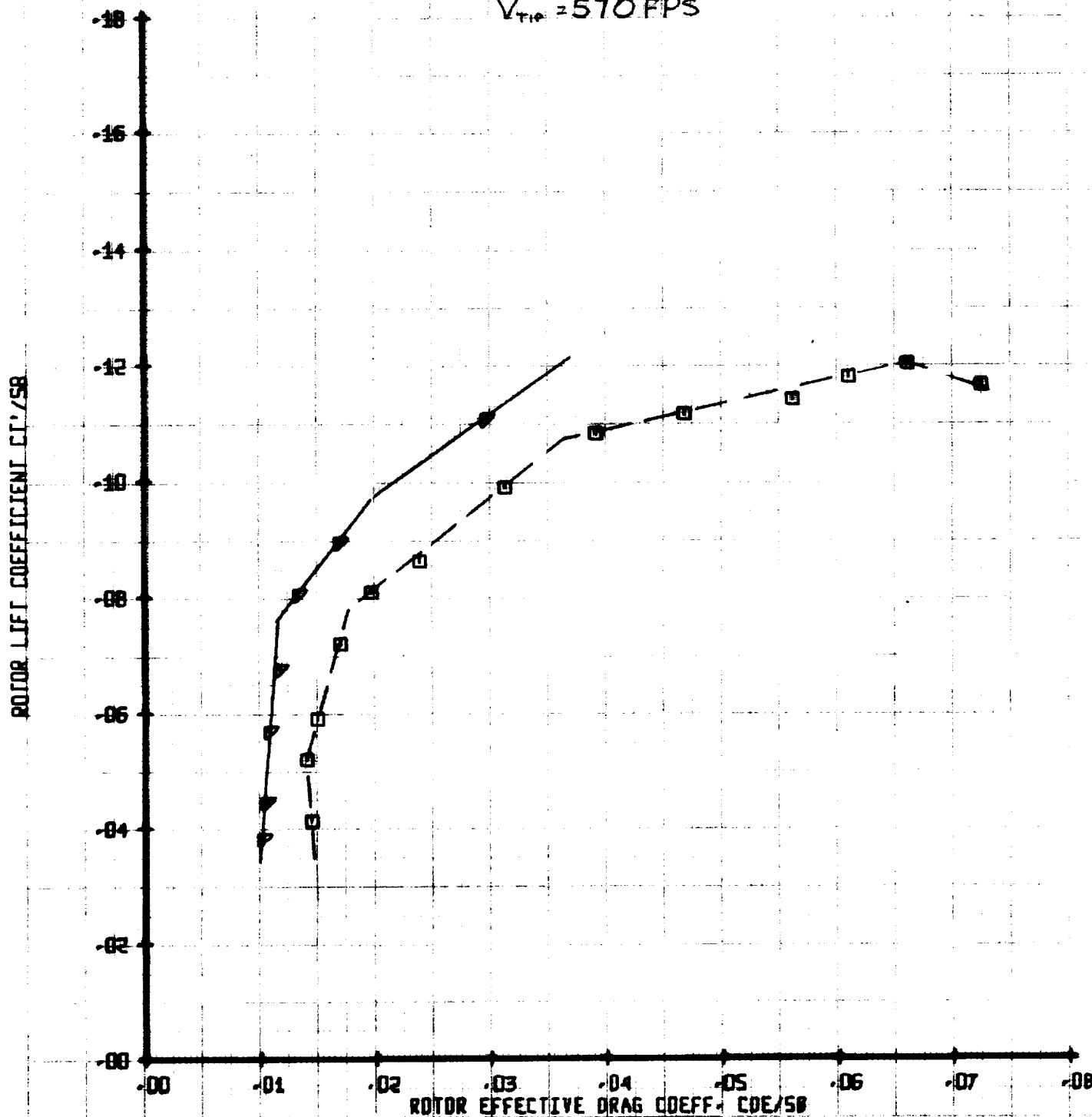
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI'	X/DO250	VILIN
□	250	.40	.05	228
△	256	.40	.05	228

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT
REDUCED TIP SPEED

$$V_{Tip} = 570 \text{ FPS}$$



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	Y/001
□	250	.40	.05	238
△	256	.40	.05	238

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

REDUCED TIP SPEED

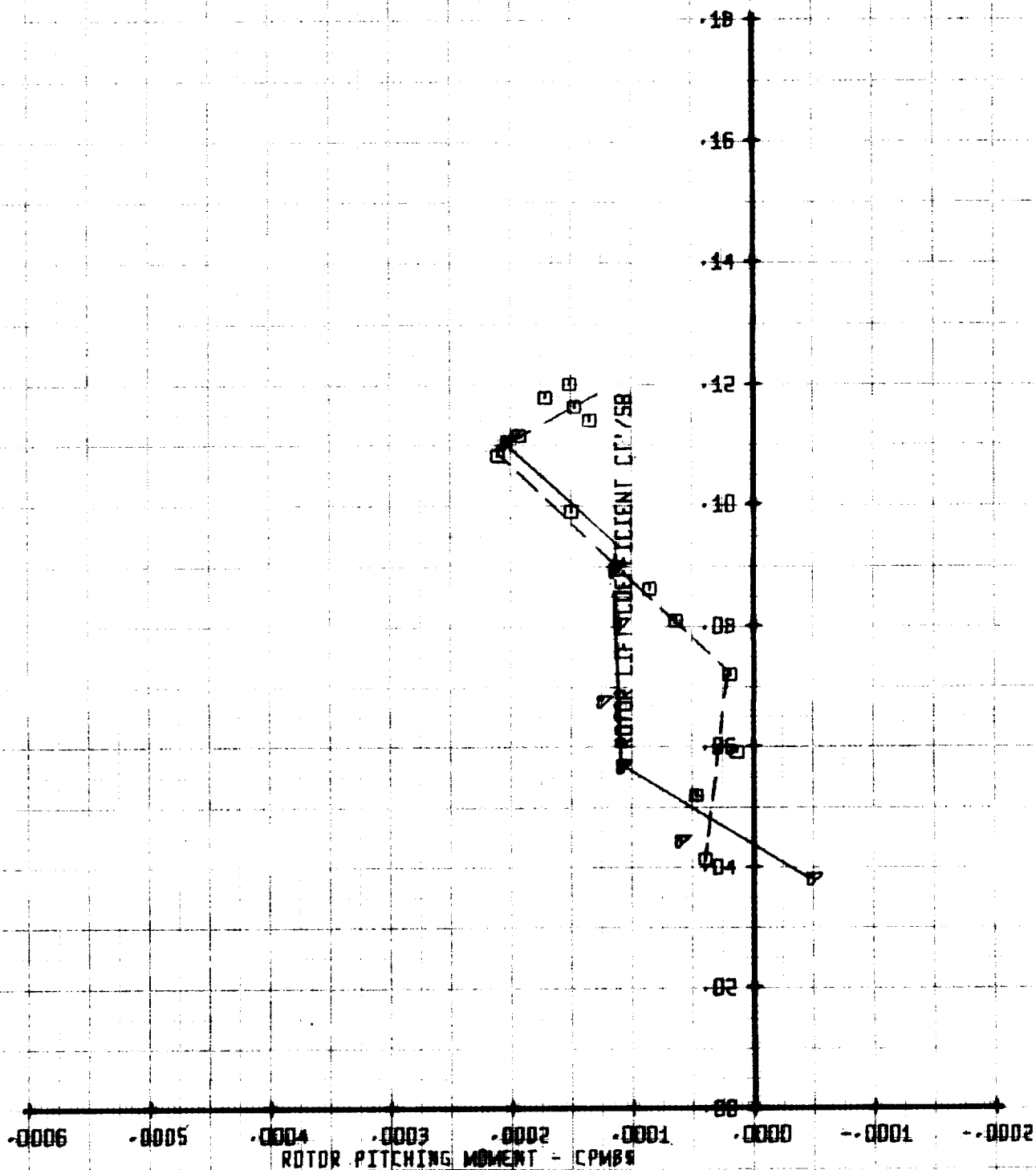


Figure A-277

LIFT-PROPULSIVE FORCE LIMIT TEST

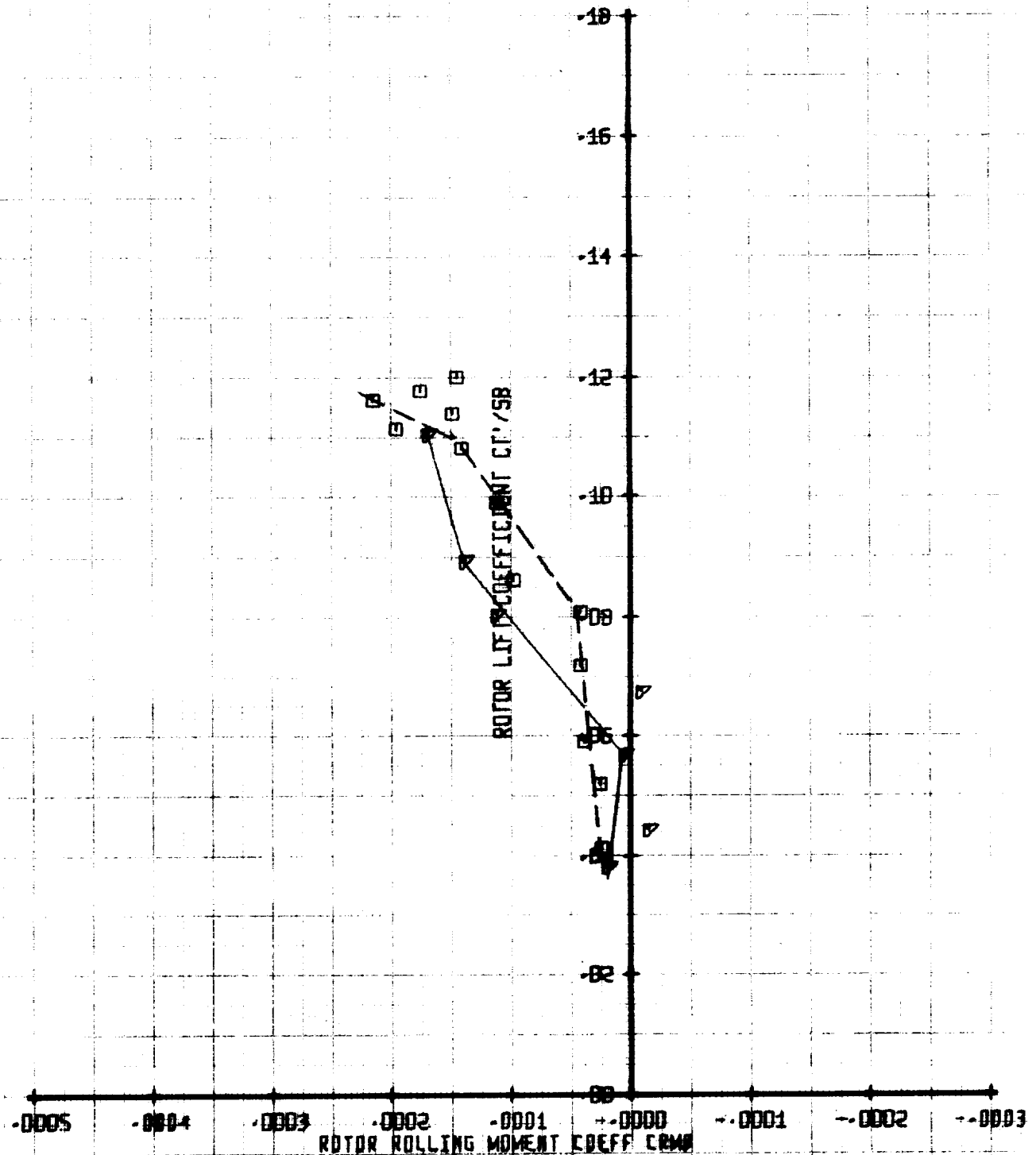
1/10 SCALE CM-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM
□
△RUN
250
256MU'
.40
.40X/00258
.05
.05YTUN
230
230

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT

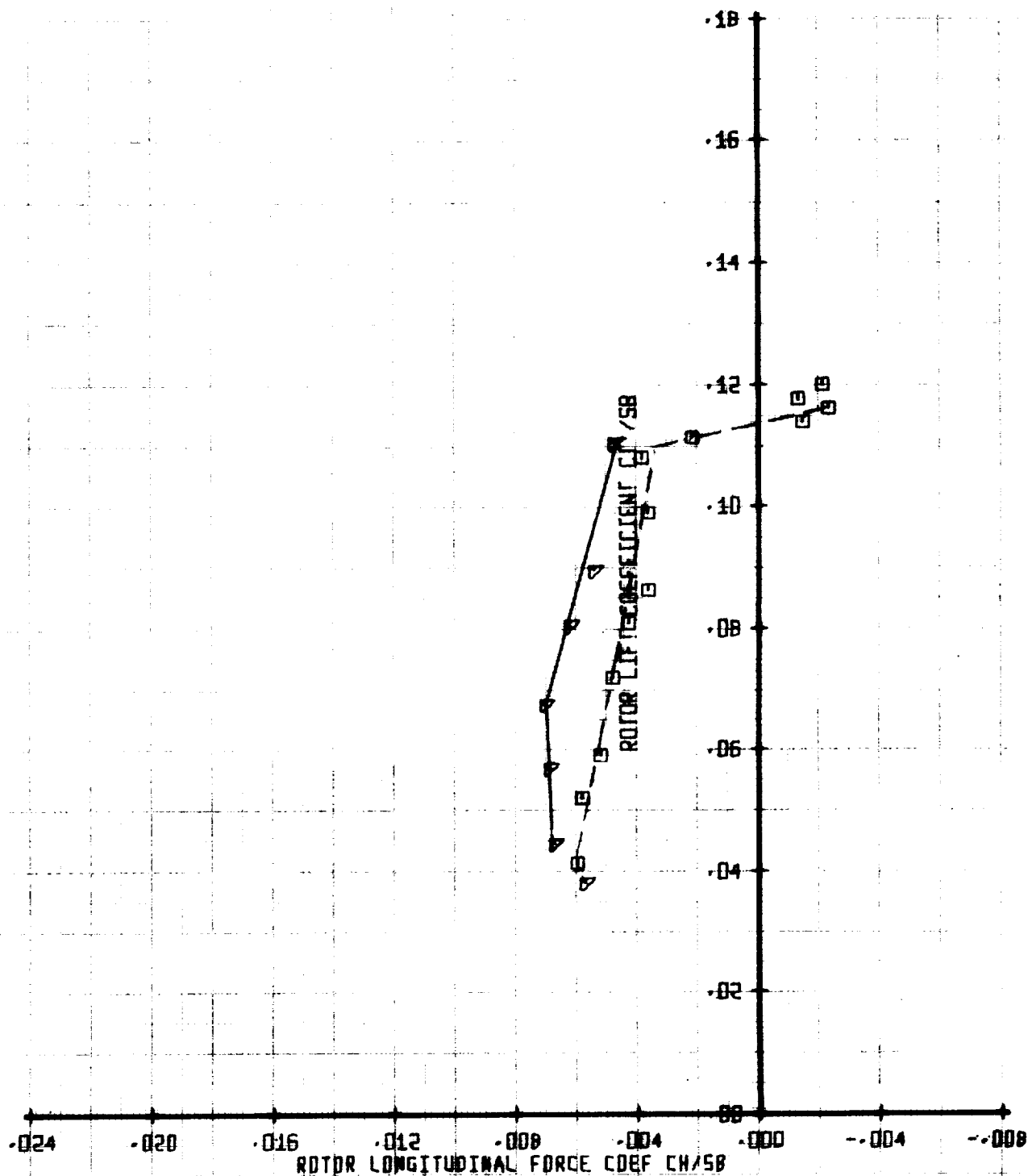
REDUCED TIP SPEED

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DD258	VTUN
□	250	.40	.05	228
△	256	.40	.05	228

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT
REDUCED TIP SPEED

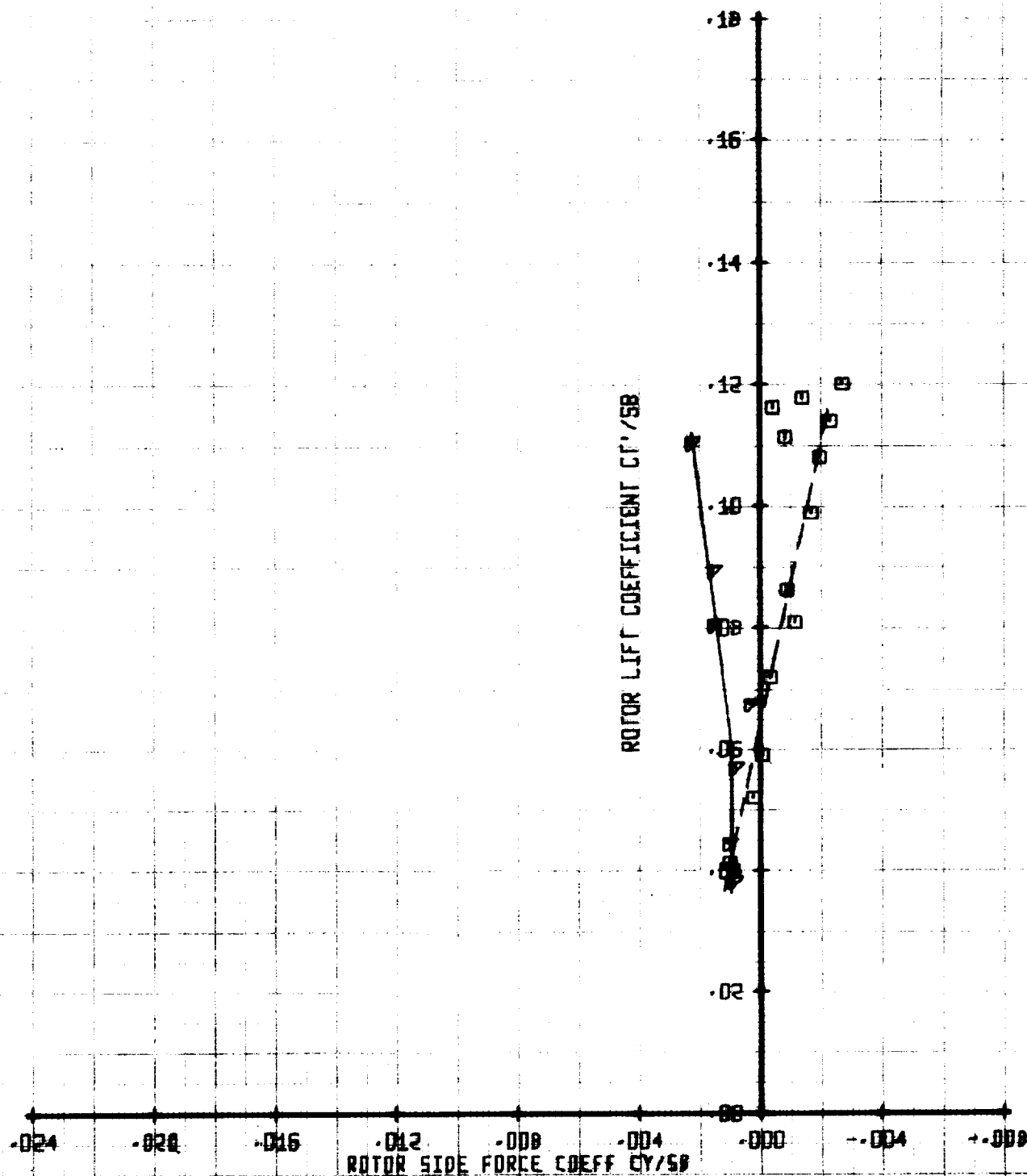


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/OD2SB	YTUN
□	250	.40	.05	220
△	256	.40	.05	220

ROTOR LIFT COEFFICIENT
 VERSUS
 ROTOR SIDE FORCE COEFFICIENT
REDUCED TIP SPEED



SET 40
 BVWT 193

Figure A-280

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTUM
0	250	.40	.05	228
7	256	.40	.05	228

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12
REDUCED TIP SPEED

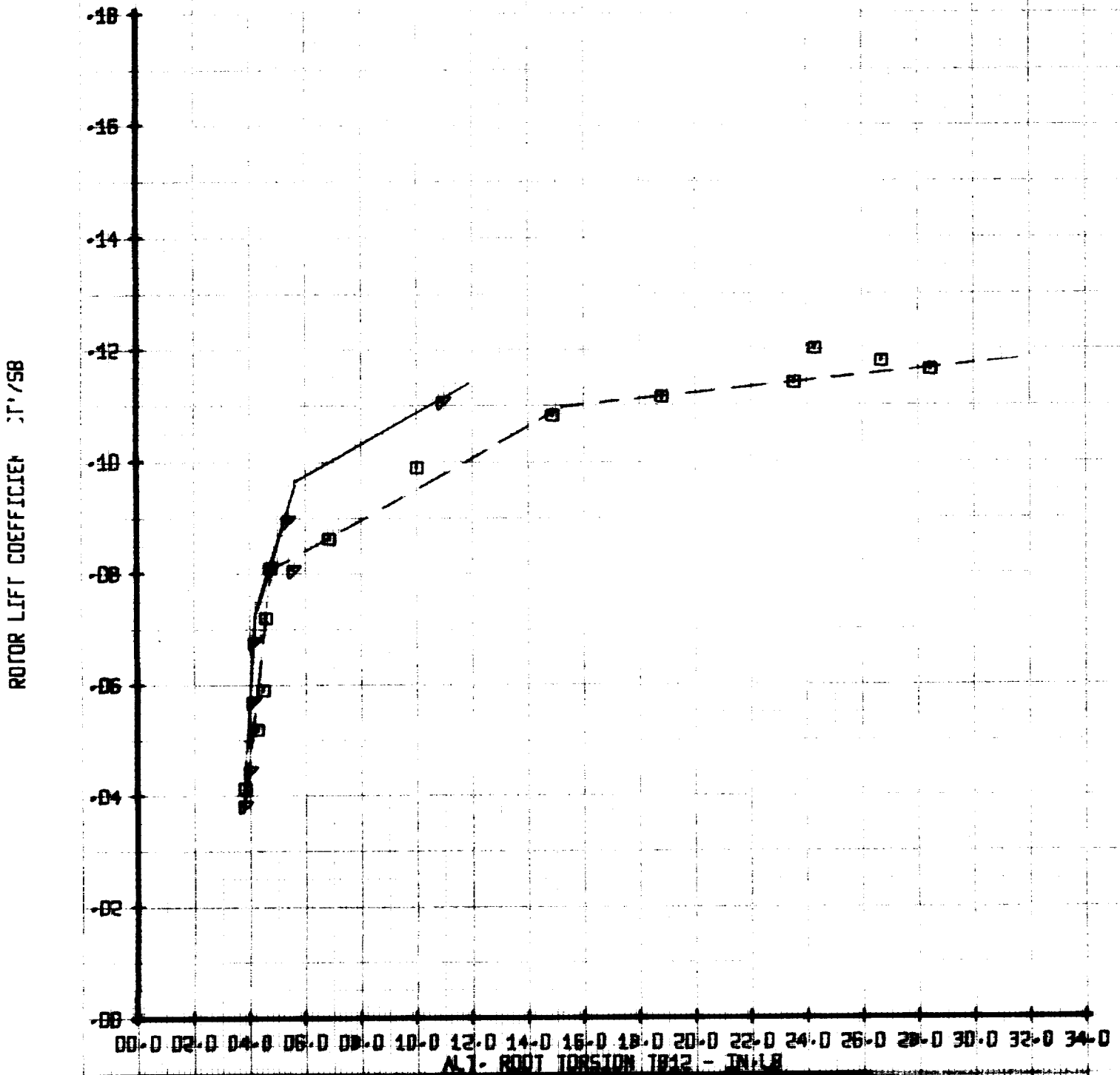


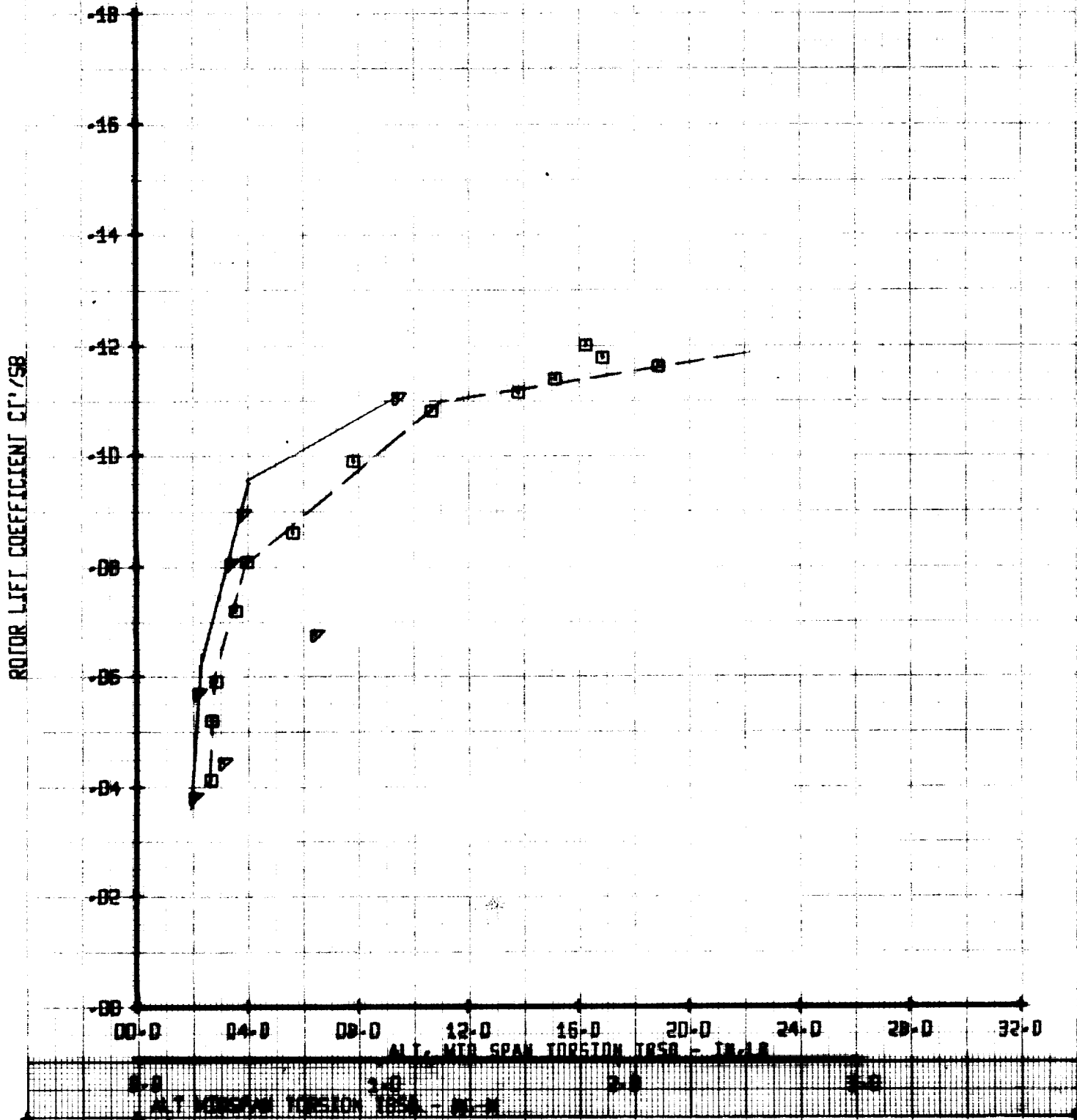
Figure A-281

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CM-47M ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00298	Y/TUN
□	250	.40	.05	228
▽	256	.40	.05	228

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50
REDUCED TIP SPEED

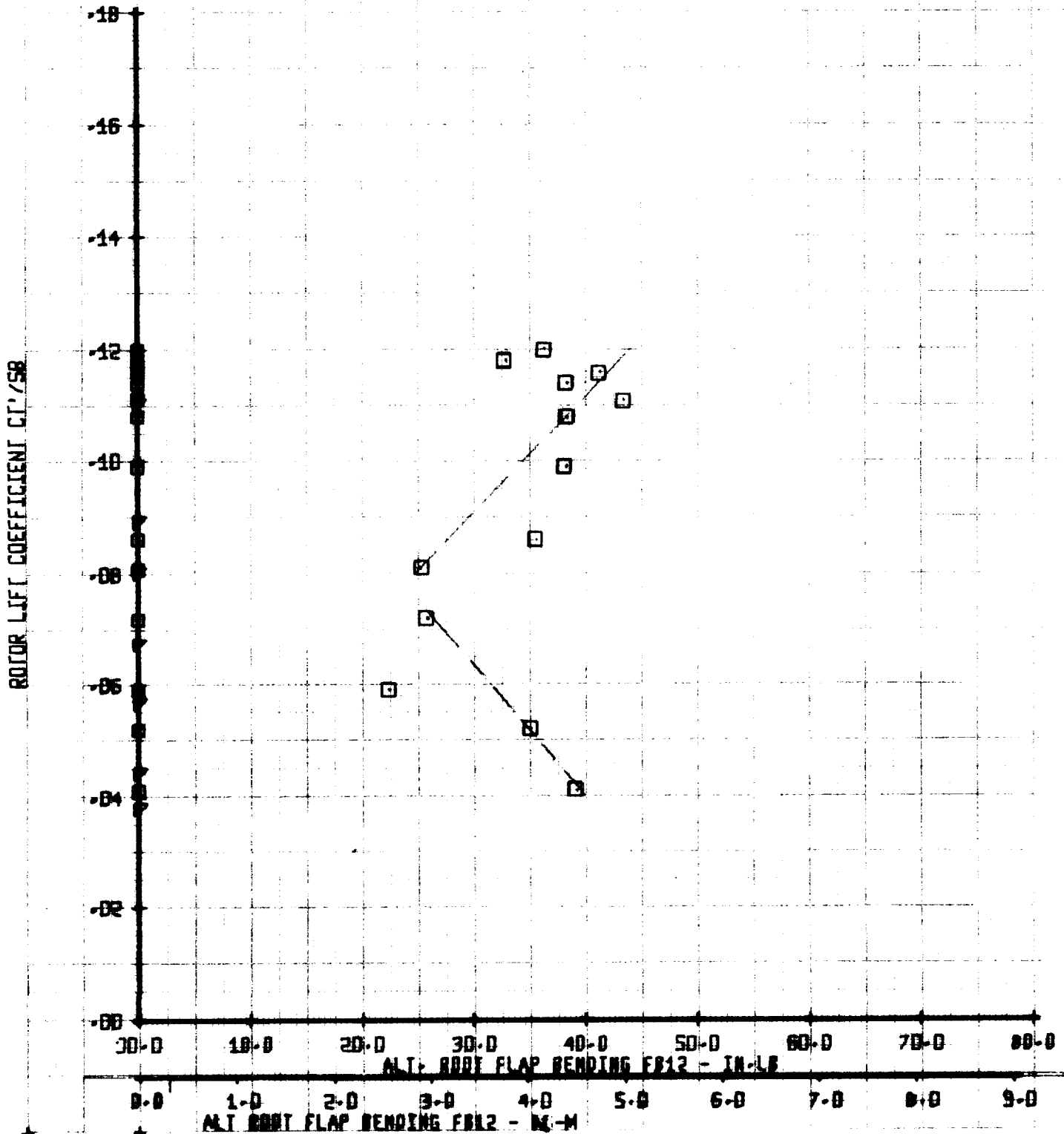


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00298	VTUM
□	250	.40	.05	220
□	290	.40	.05	220

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12
REDUCED TIP SPEED

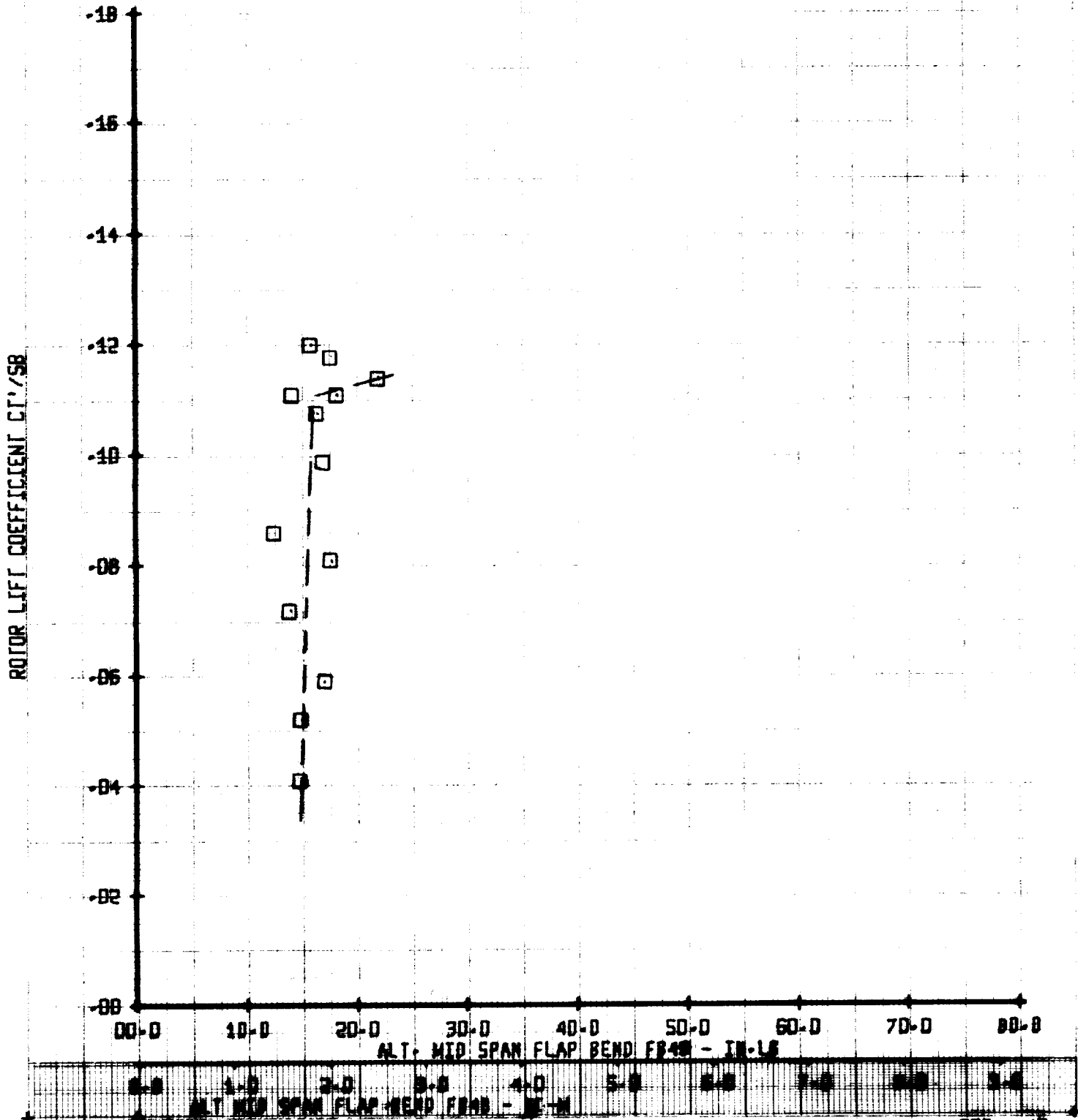


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00298	YTLN
□	250	.40	.05	228
□	256	.40	.05	228

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN FLAP BENDING FB40
REDUCED TIP SPEED



LIFT-PROPULSIVE FORCE LIMIT TEST

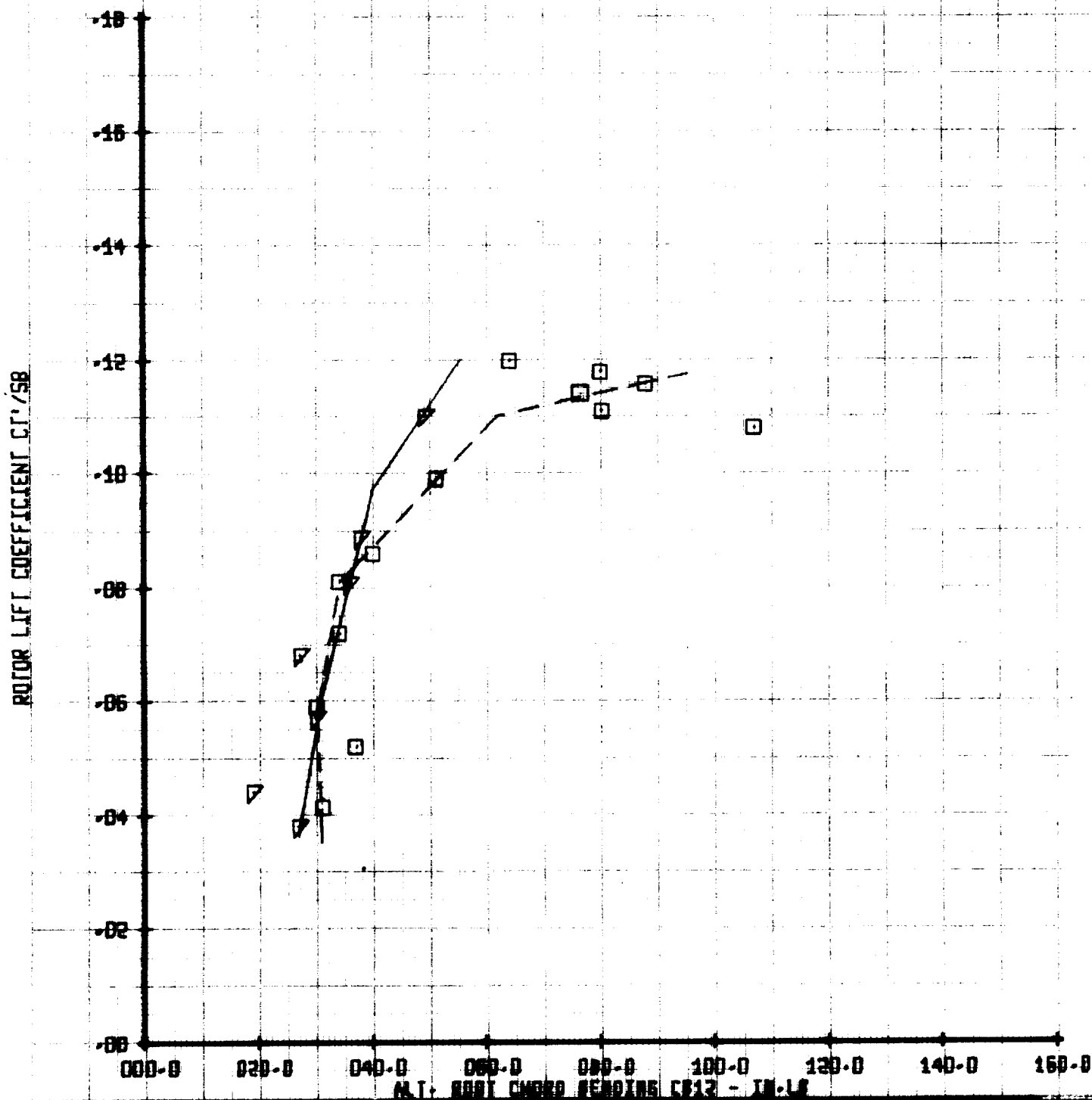
1/10 SCALE CH-47B ROTOR

LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00298	YTLN
□	250	.40	.05	220
▽	256	.40	.05	220

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12
REDUCED TIP SPEED

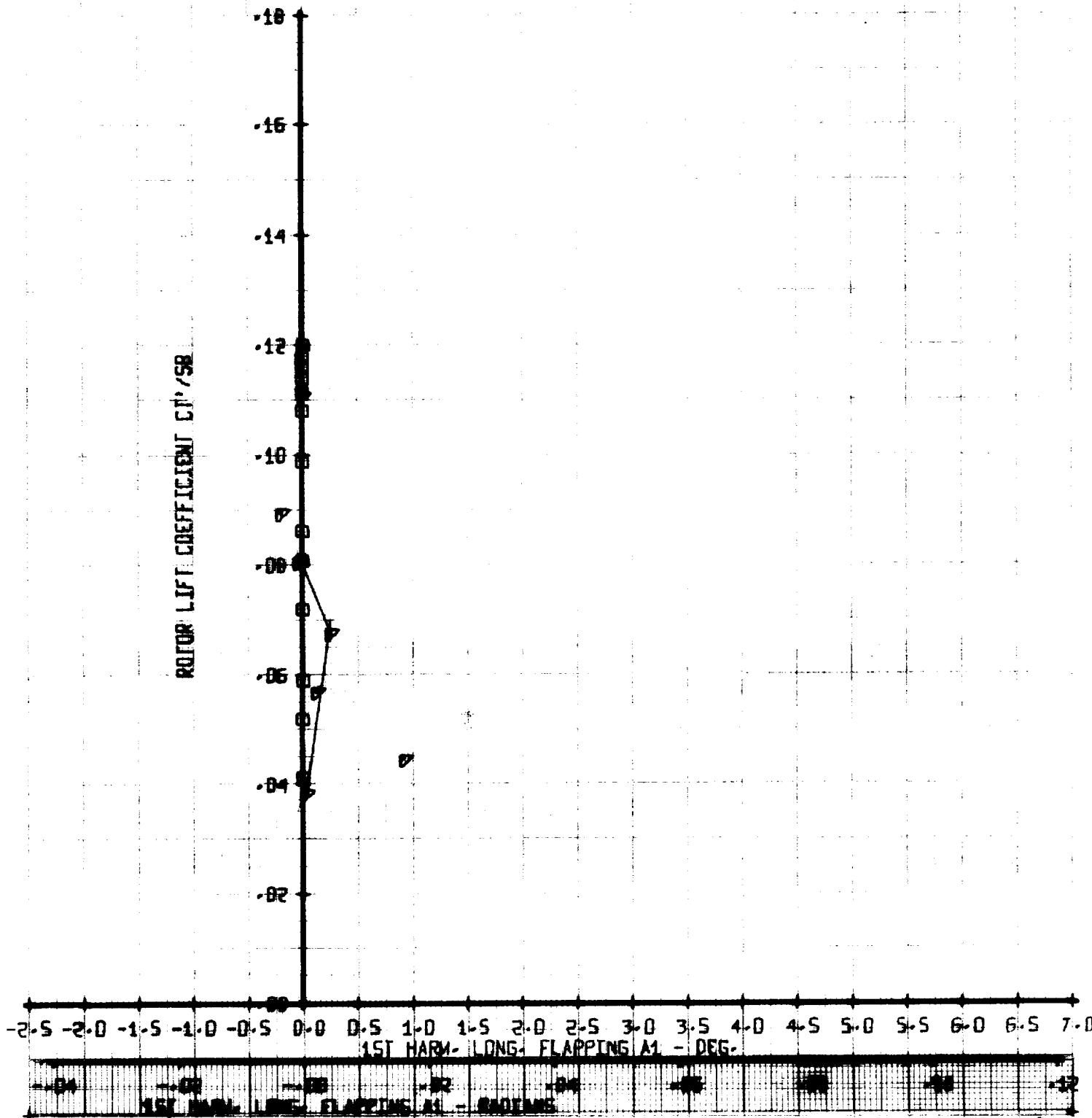


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/OD2SB	Y/TUN
0	250	.40	.05	228
7	256	.40	.05	228

ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1
REDUCED TIP SPEED



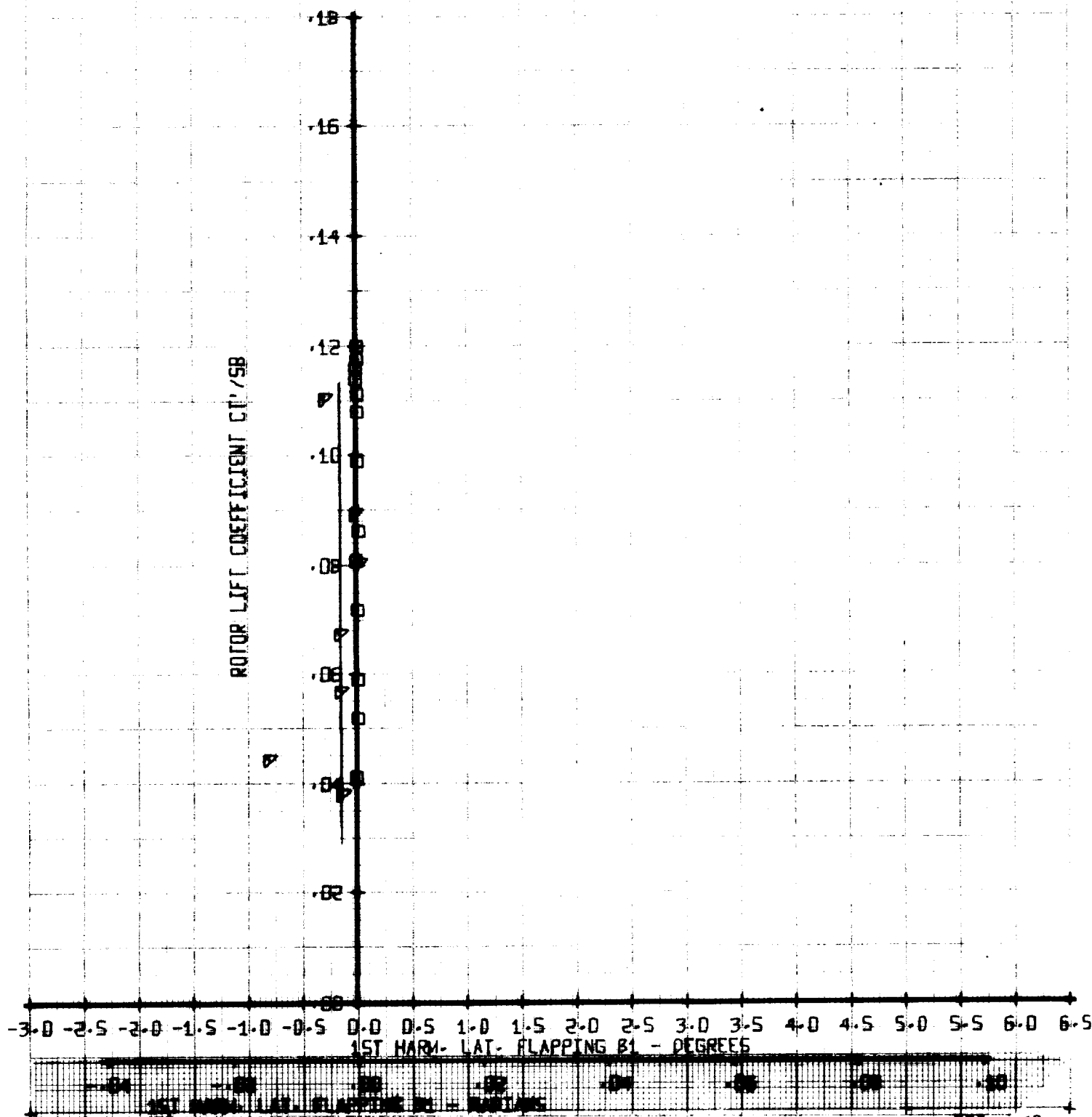
SET 40
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	Y/TUN
□	250	.40	.05	228
▽	256	.40	.05	228

ROTOR LIFT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1
REDUCED TIP SPEED



SET 40
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/OD258	YTUN
□	250	.40	.05	228
▽	256	.40	.05	228

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE

REDUCED TIP SPEED

ROTOR LIFT COEFFICIENT $C_T/58$

-3.0 -2.0 -1.0 0.0 1.0 2.0 3.0
ALT. LEAD-LAG ANGLE - DEGREES

ALT. LEAD-LAG ANGLE - RADIANS

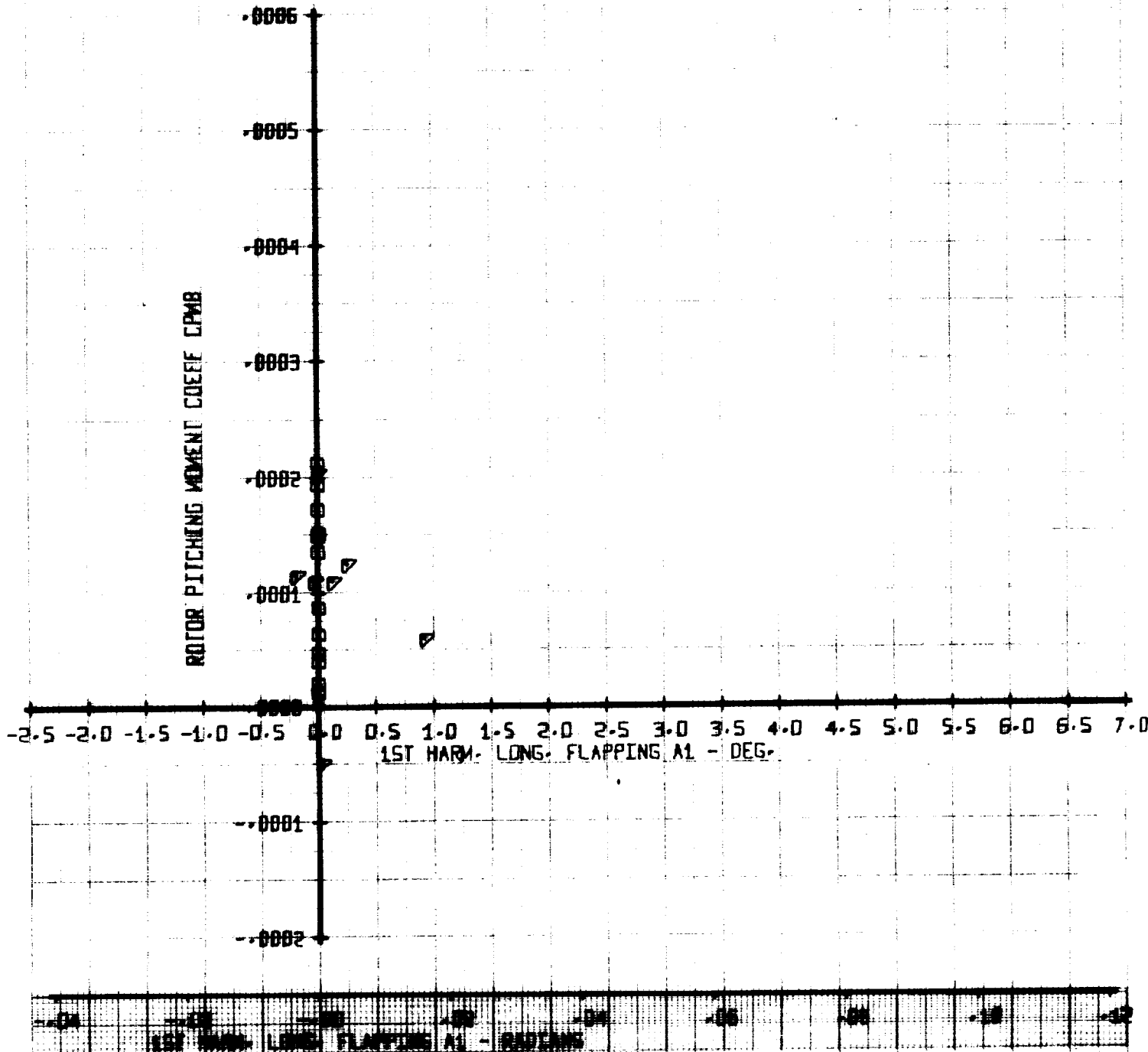
SET 40
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/DD2SB	YTUN
0	250	.40	.05	238
7	256	.40	.05	238

ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1
REDUCED TIP SPEED



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND					
SYM	RUN	ML'	X/00258	Y/LIN	
□	250	.40	.05	228	
▽	256	.40	.05	228	

ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1
REDUCED TIP SPEED

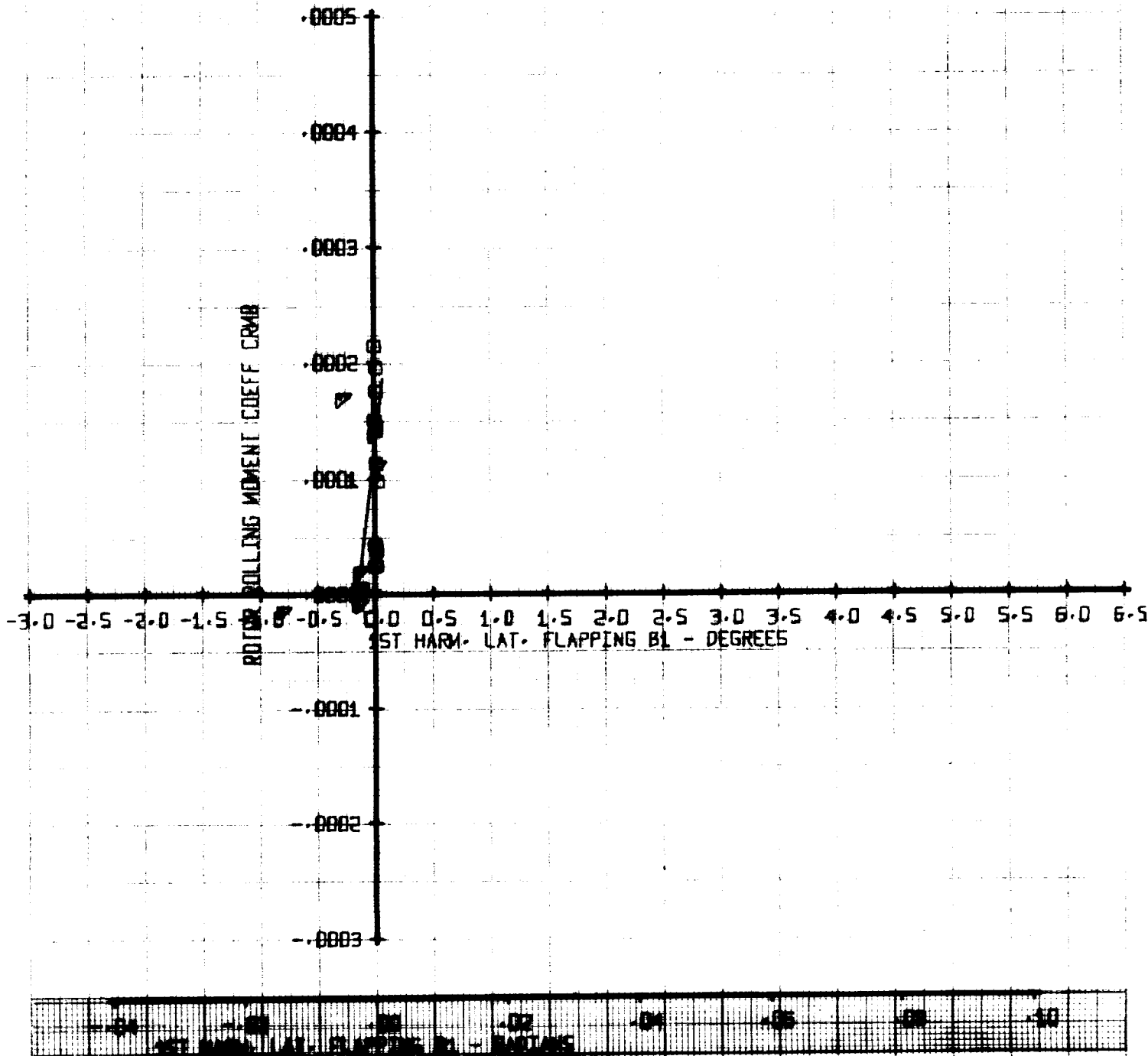


Figure A-290

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND
 SYM RUN MU'
 □ 251 .45
 ▽ 255 .45

X/00258 Y/TUN
 .05 256
 .05 256

ROTOR LIFT COEFFICIENT
 VERSUS
 ROTOR PROPULSIVE FORCE COEFFICIENT
 REDUCED TIP SPEED

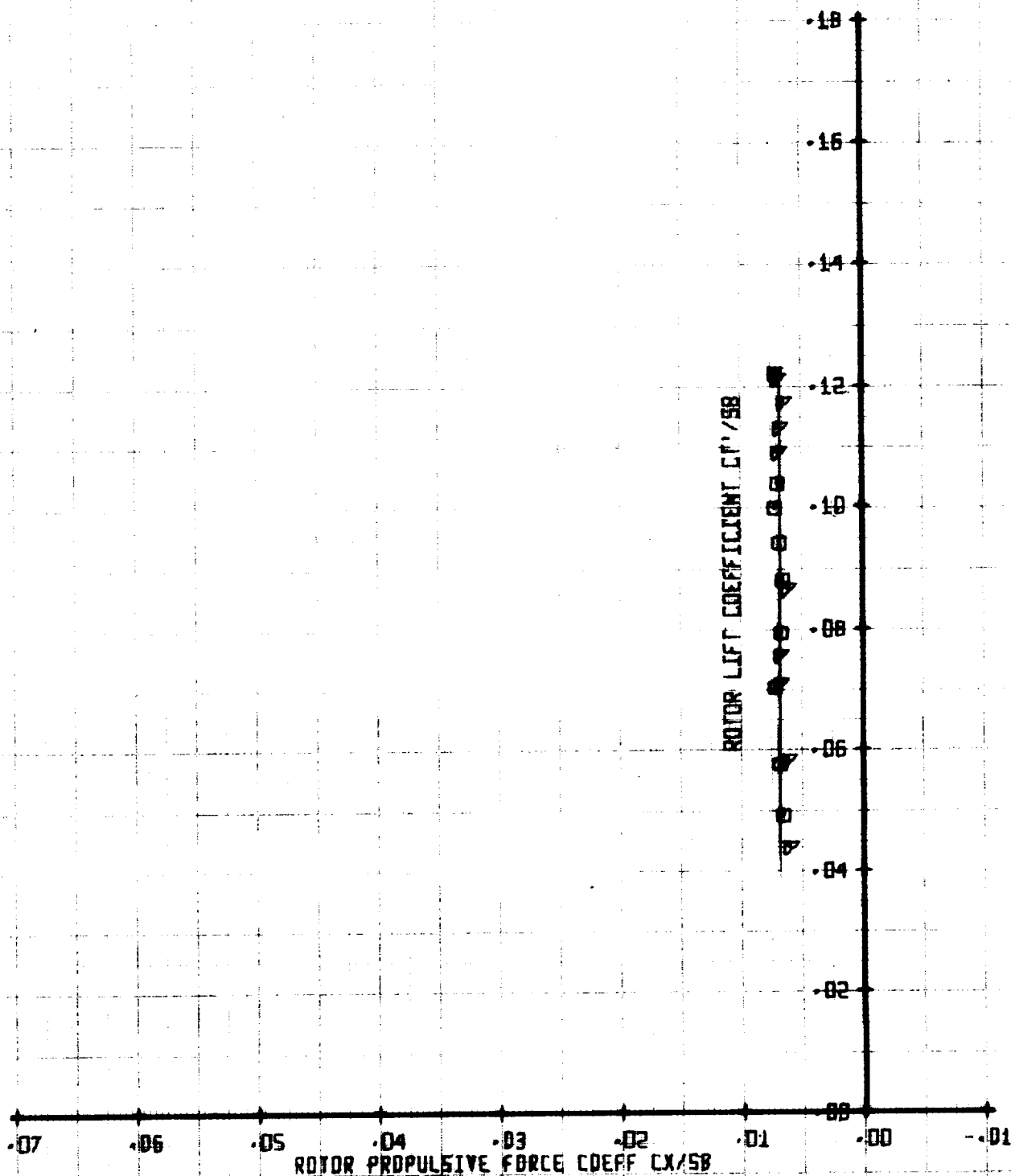


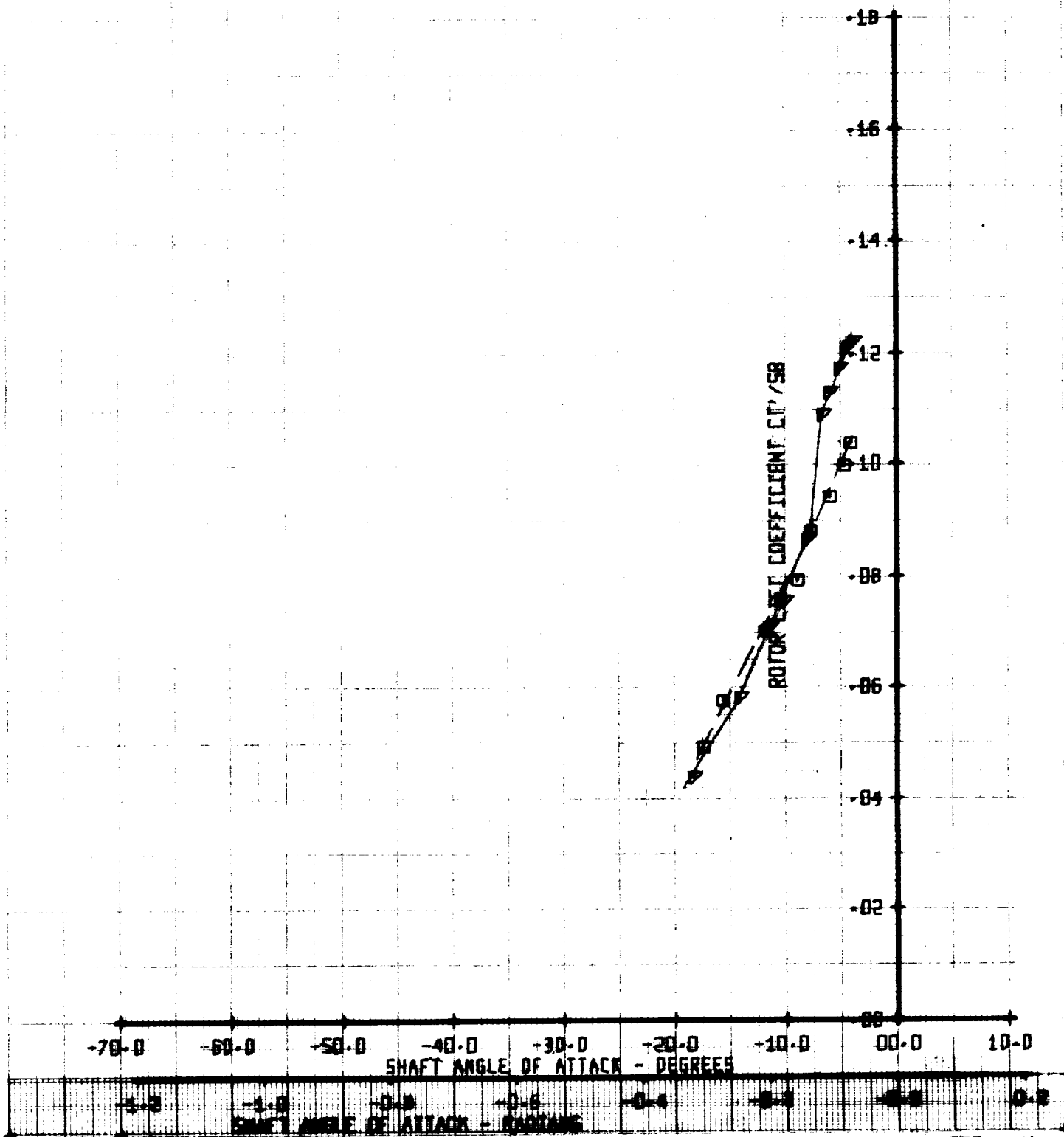
Figure A-291

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	251	.45	.05	256
◊	255	.45	.05	256

ROTOR LIFT COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK
REDUCED TIP SPEED



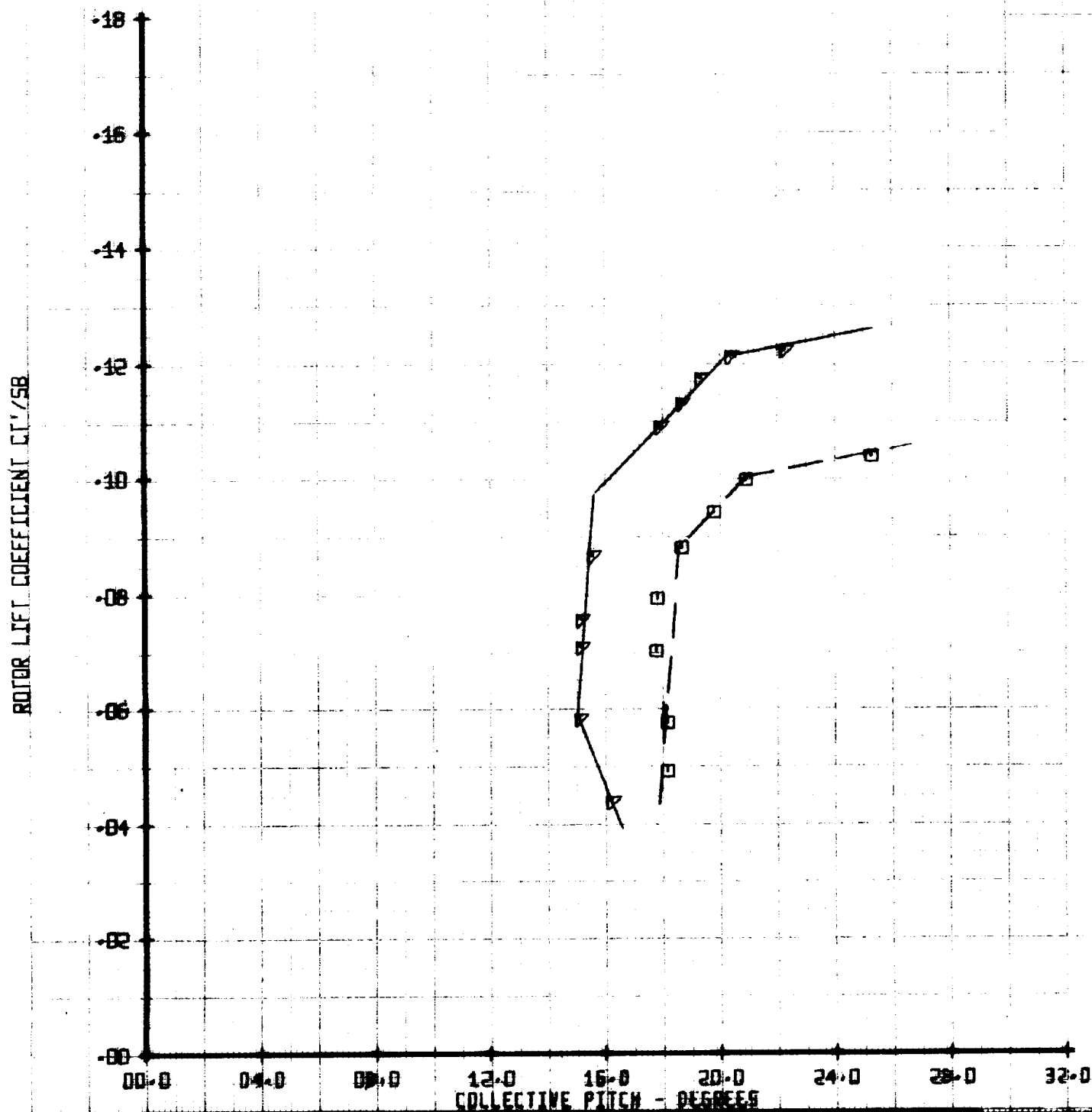
SET 41
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM		RUN		MLT		X/00258		Y/001	
□	251	0.45	0.05	256					
▽	255	0.45	0.05	256					

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH

REDUCED TIP SPEED

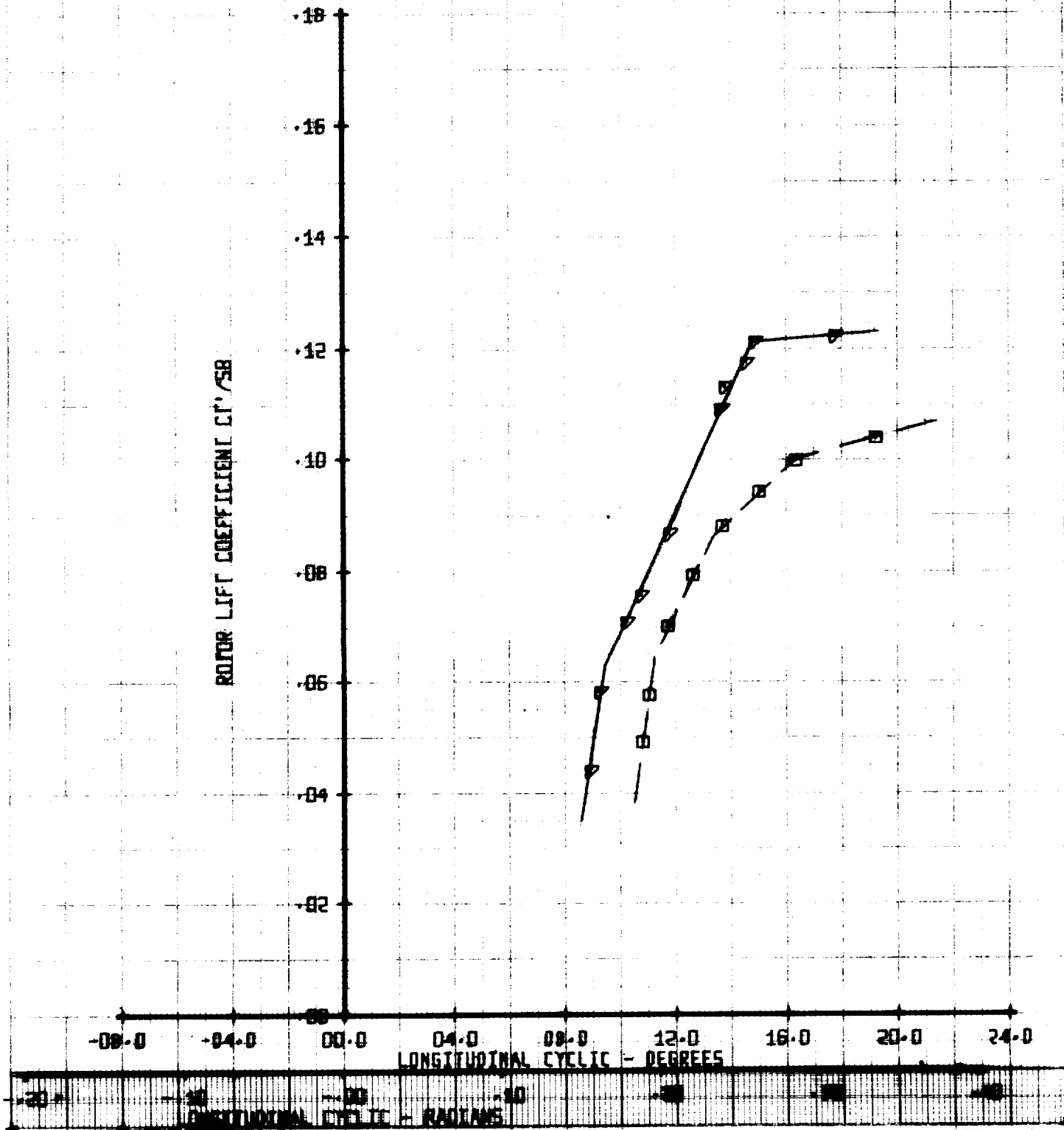


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

		LEGEND		
SYM	RUN	MU'	X/00258	Y/01
□	251	.45	.05	256
▽	255	.45	.05	256

ROTOR LIFT COEFFICIENT
VERSUS
LONGITUDINAL CYCLIC
REDUCED TIP SPEED

ROTOR LIFT COEFFICIENT $C_l' / 58$

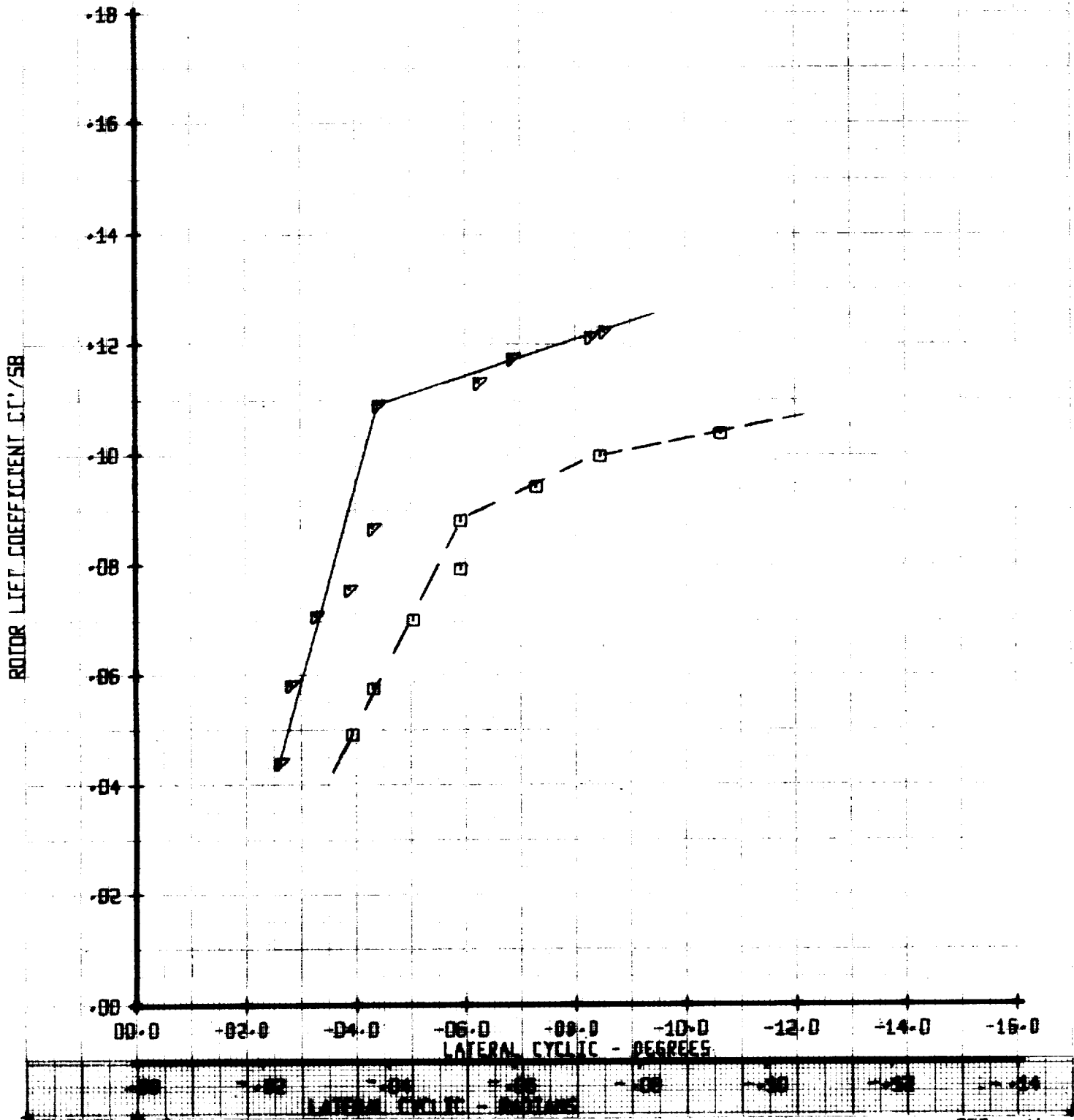


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-17B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU	X/00258	VTUN
□	251	.45	.05	256
▽	255	.45	.05	256

ROTOR LIFT COEFFICIENT
 VERSUS
 LATERAL CYCLIC
REDUCED TIP SPEED



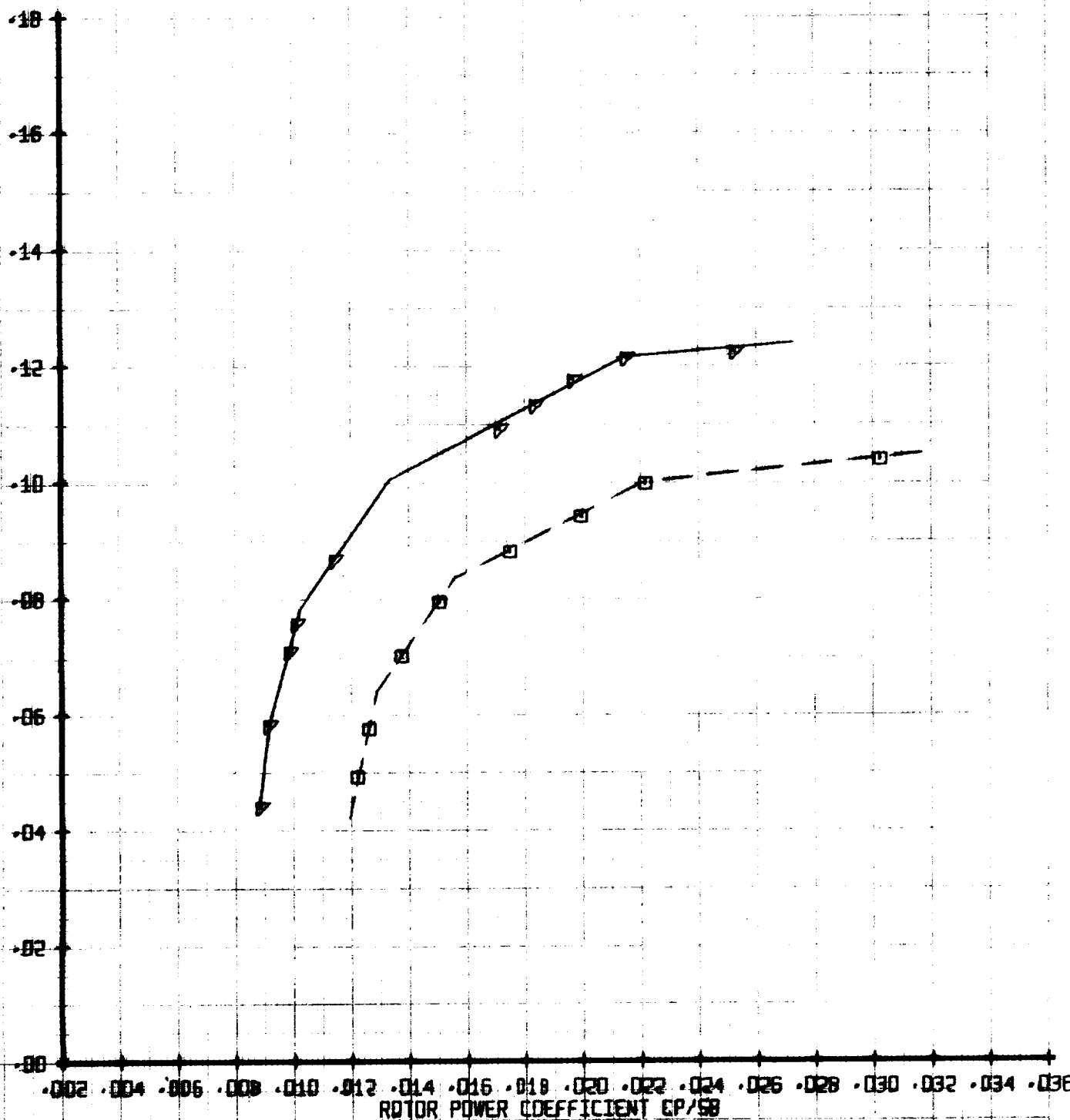
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MI	X/00258	VTUN
□	251	.45	.05	256
▽	255	.45	.05	256

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT
REDUCED TIP SPEED

ROTOR LIFT COEFFICIENT CP/58



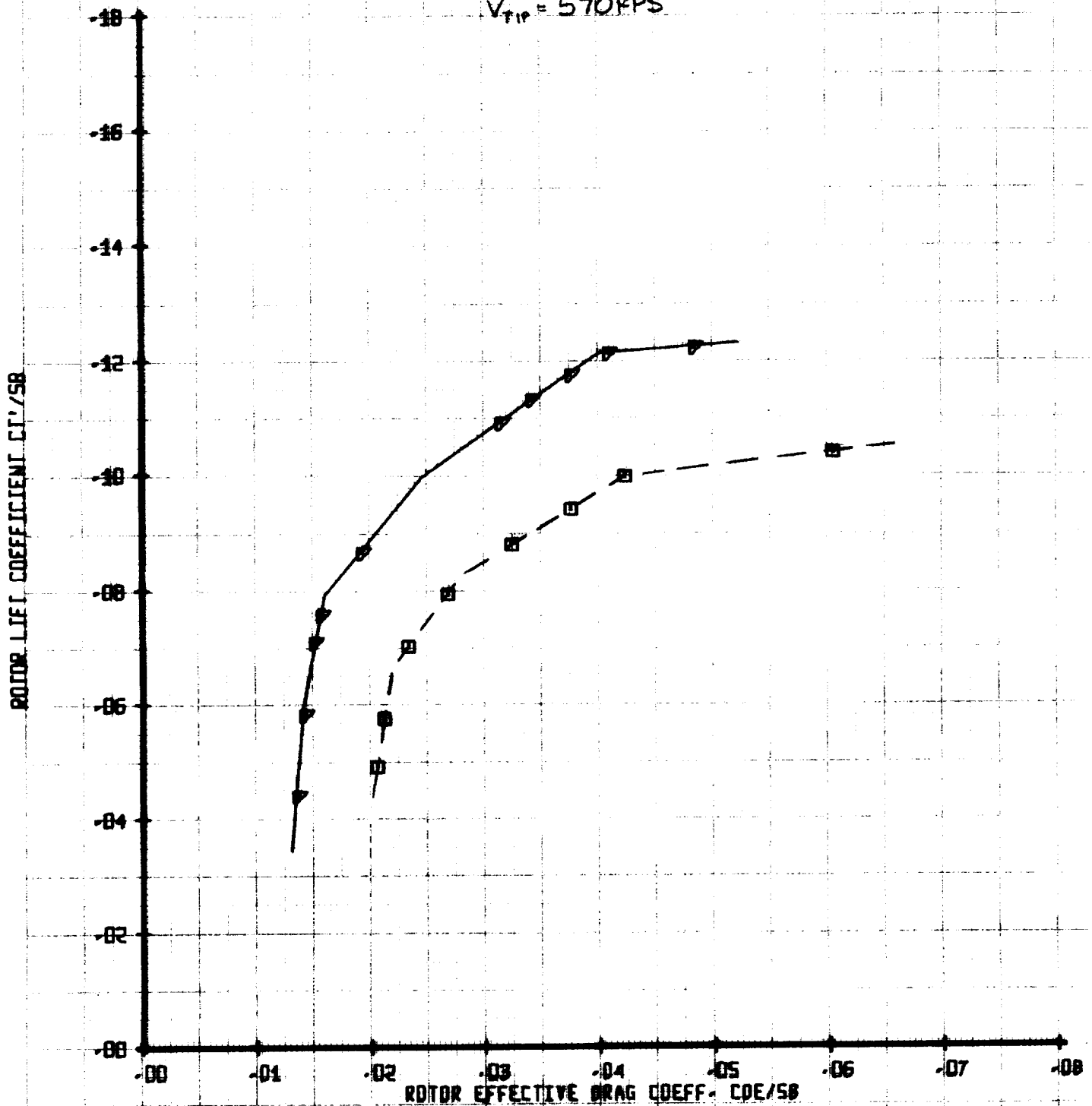
ROTOR POWER COEFFICIENT CP/58

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND				
SYM	RUN	ML'	X/100250	Y/TUN
□	251	.45	.05	256
▽	255	.45	.05	256

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT
REDUCED TIP SPEED

$$V_{tip} = 570 \text{ FPS}$$



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTUN
□	251	.45	.05	256
○	255	.45	.05	256

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

REDUCED TIP SPEED

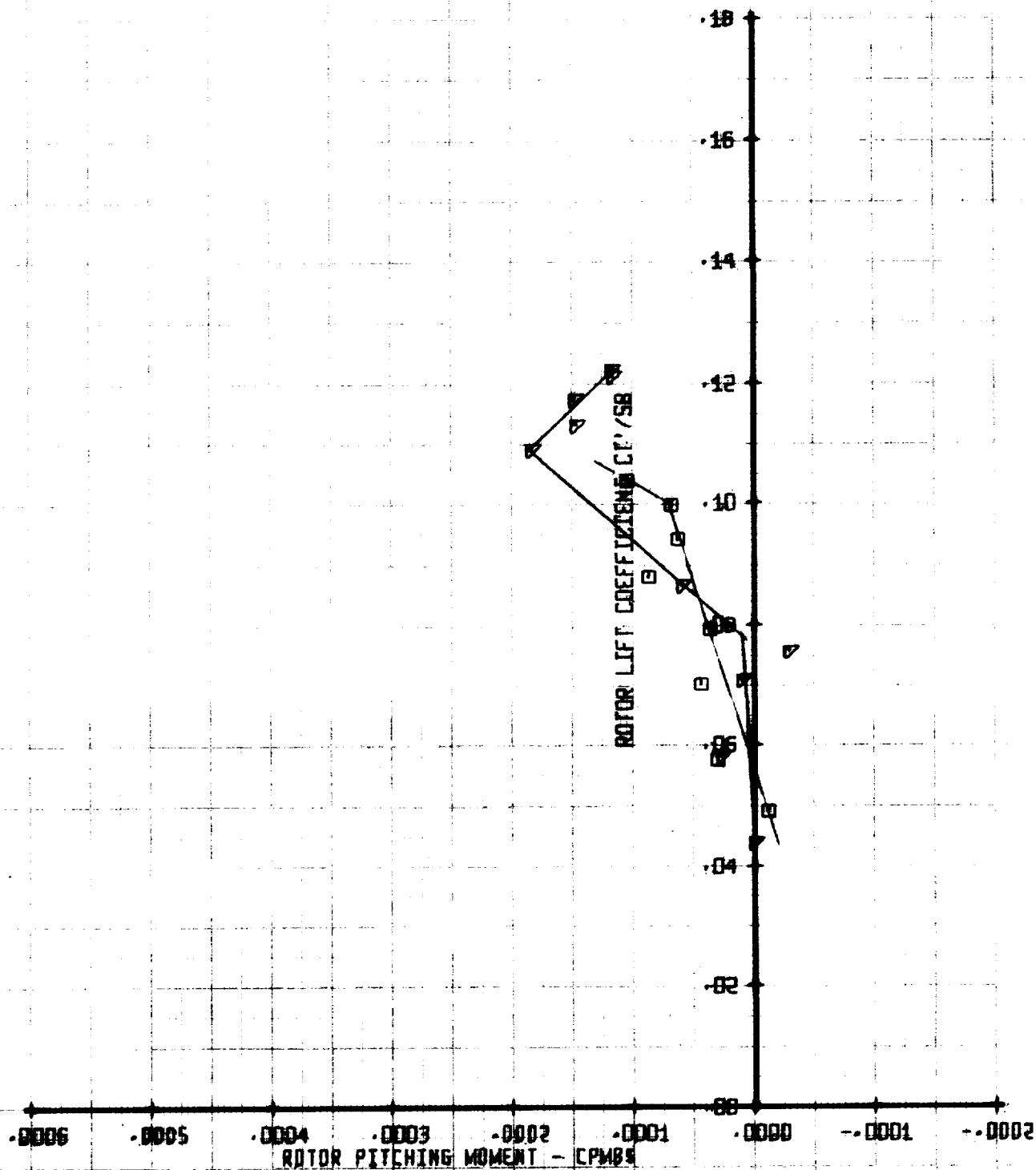


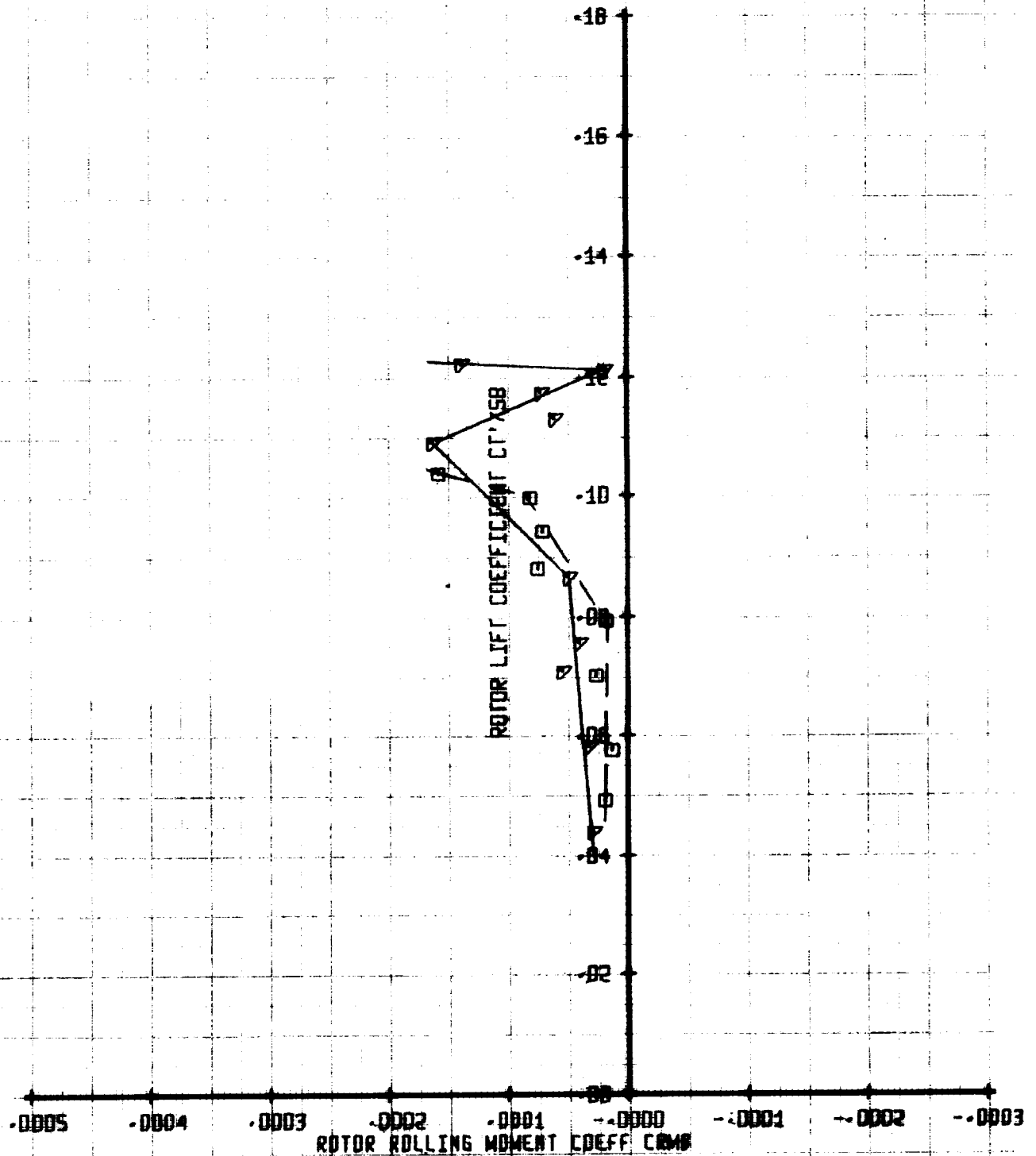
Figure A-297

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	VTUN
□	251	.45	.05	256
▽	255	.45	.05	256

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT
REDUCED TIP SPEED



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	251	.45	.05	256
△	255	.45	.05	256

ROTOR LIFT COEFFICIENT
 VERSUS
 ROTOR LONGITUDINAL FORCE COEFFICIENT
REDUCED TIP SPEED

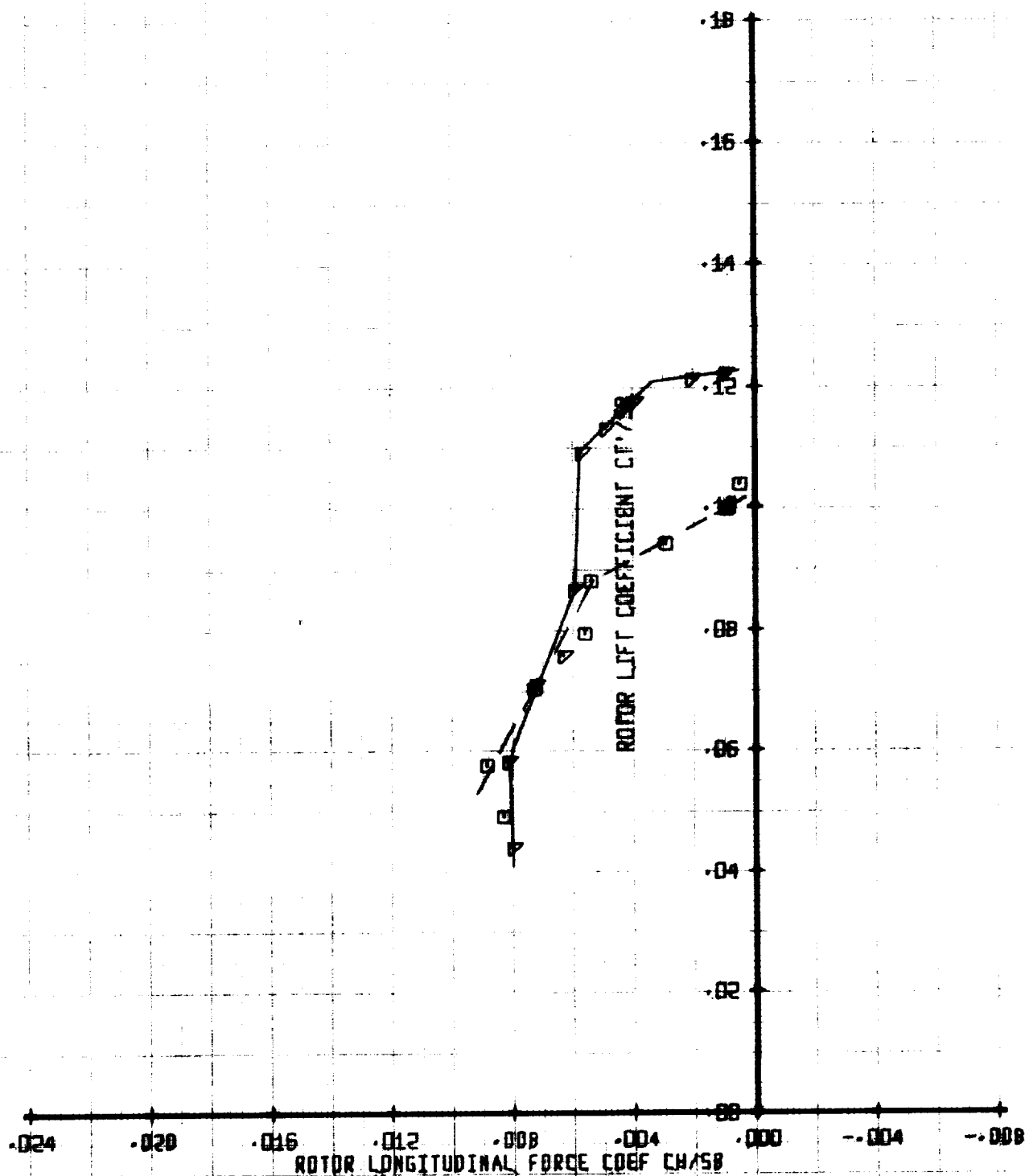


Figure A-299

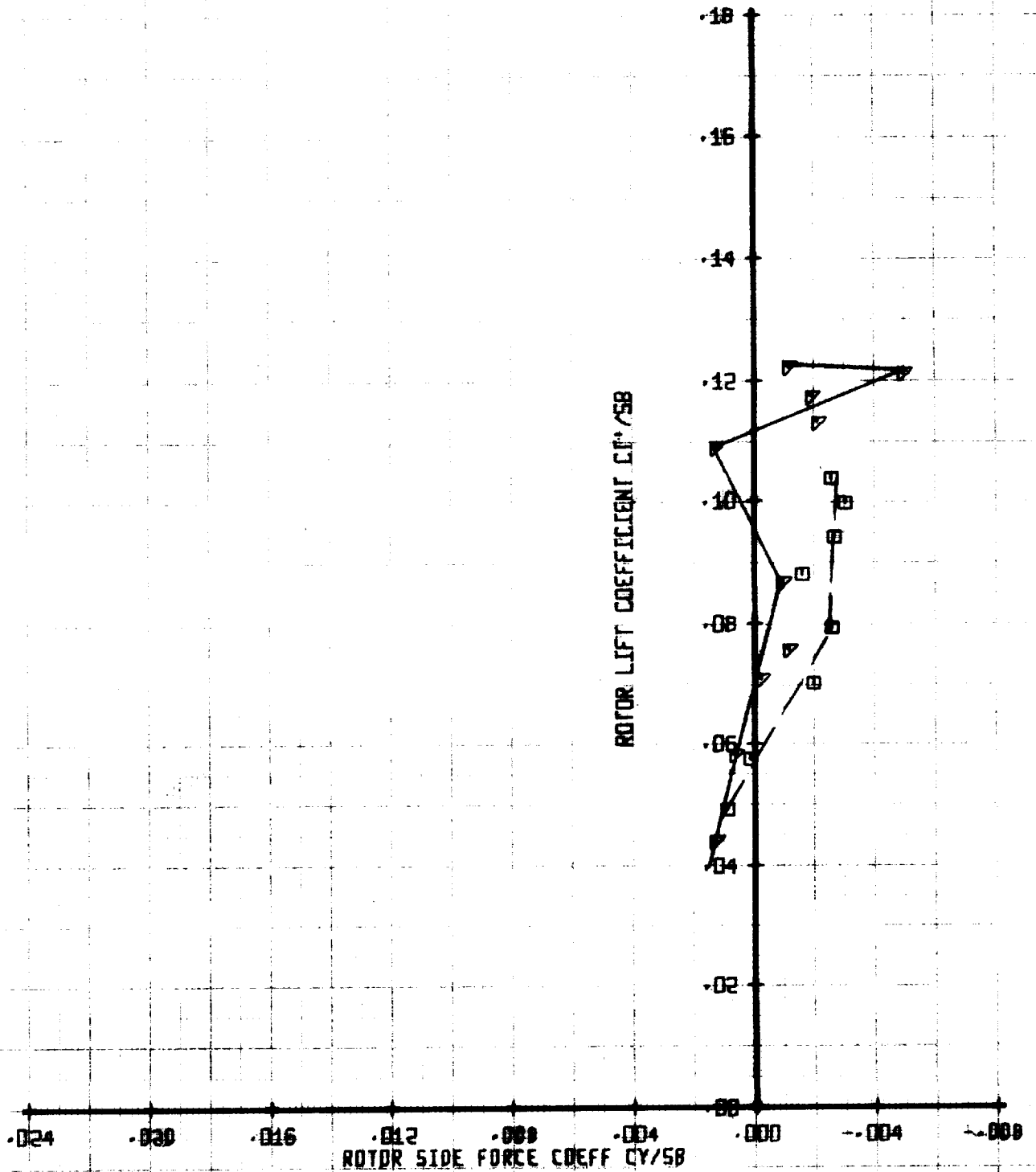
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU
□	251	.45
△	255	.45

X/00258	Y/TUN
.05	256
.05	256

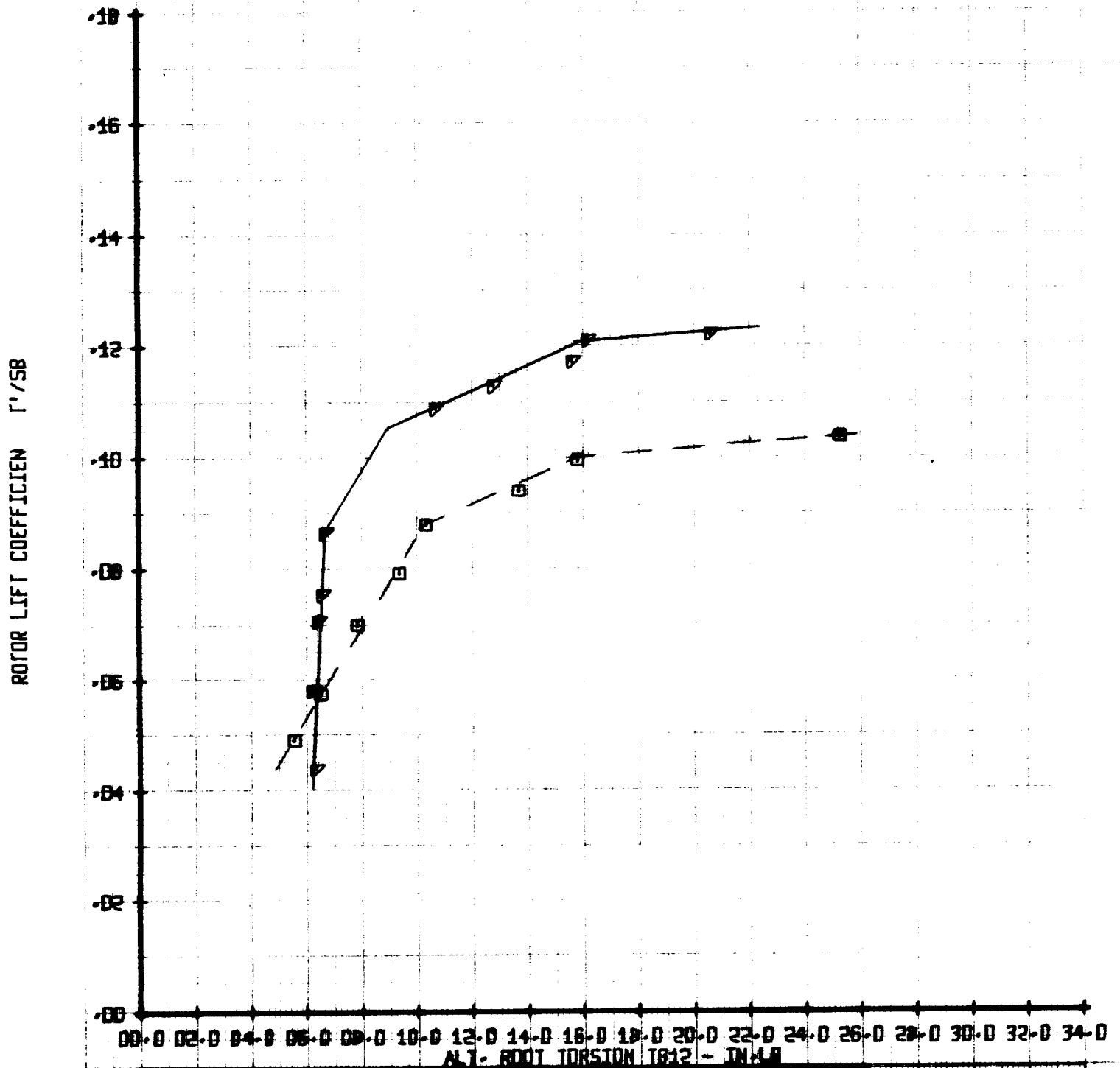
ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT
REDUCED TIP SPEED



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND				
SYM	RUN	ML'	X/00258	VILN
□	251	.45	.05	256
▽	255	.45	.05	256

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12
REDUCED TIP SPEED

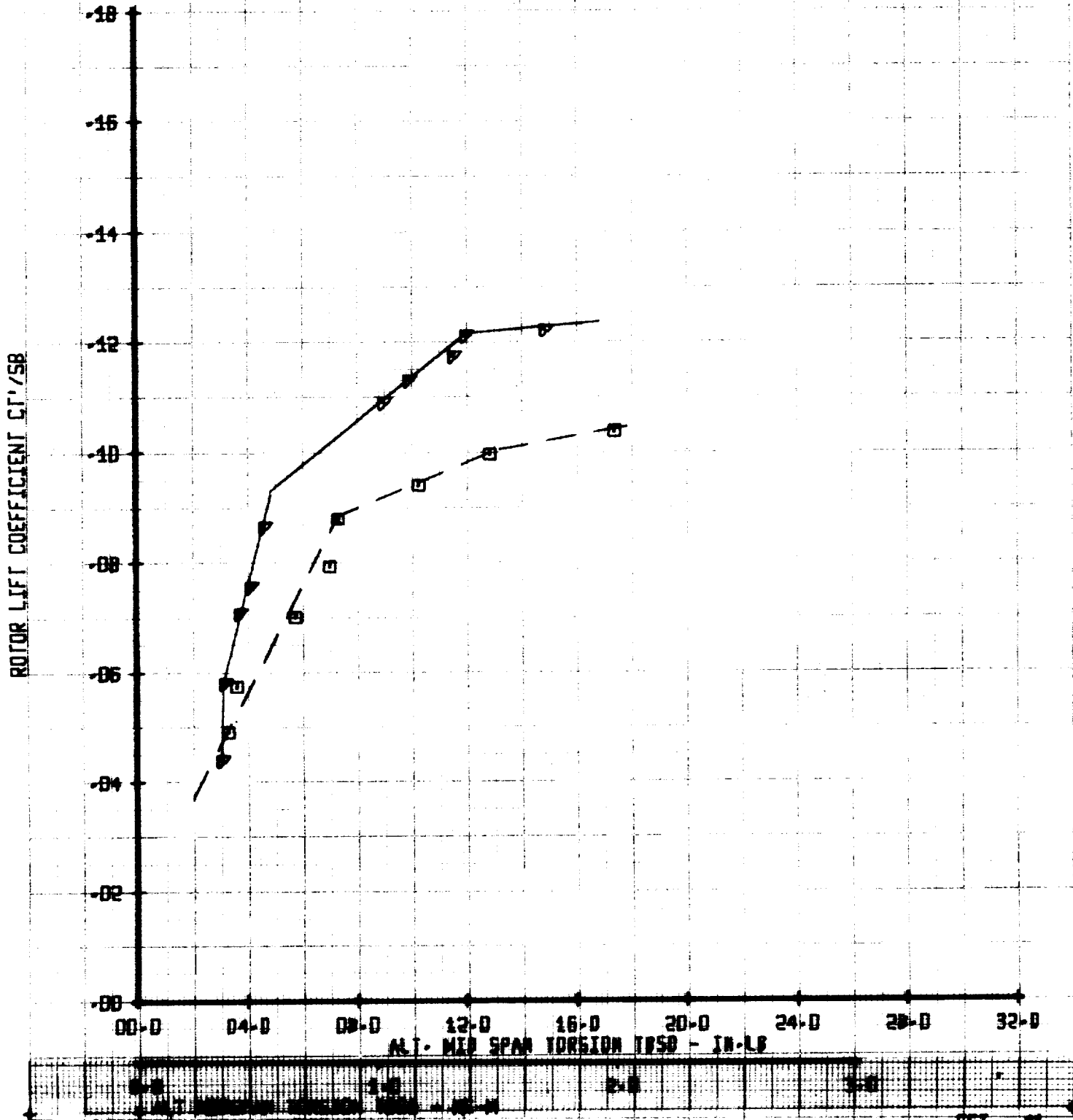


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM		RUN		MU'		X/00298		VTUN	
0	0	251	255	.45	.45	.05	.05	256	256

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50

REDUCED TIP SPEED



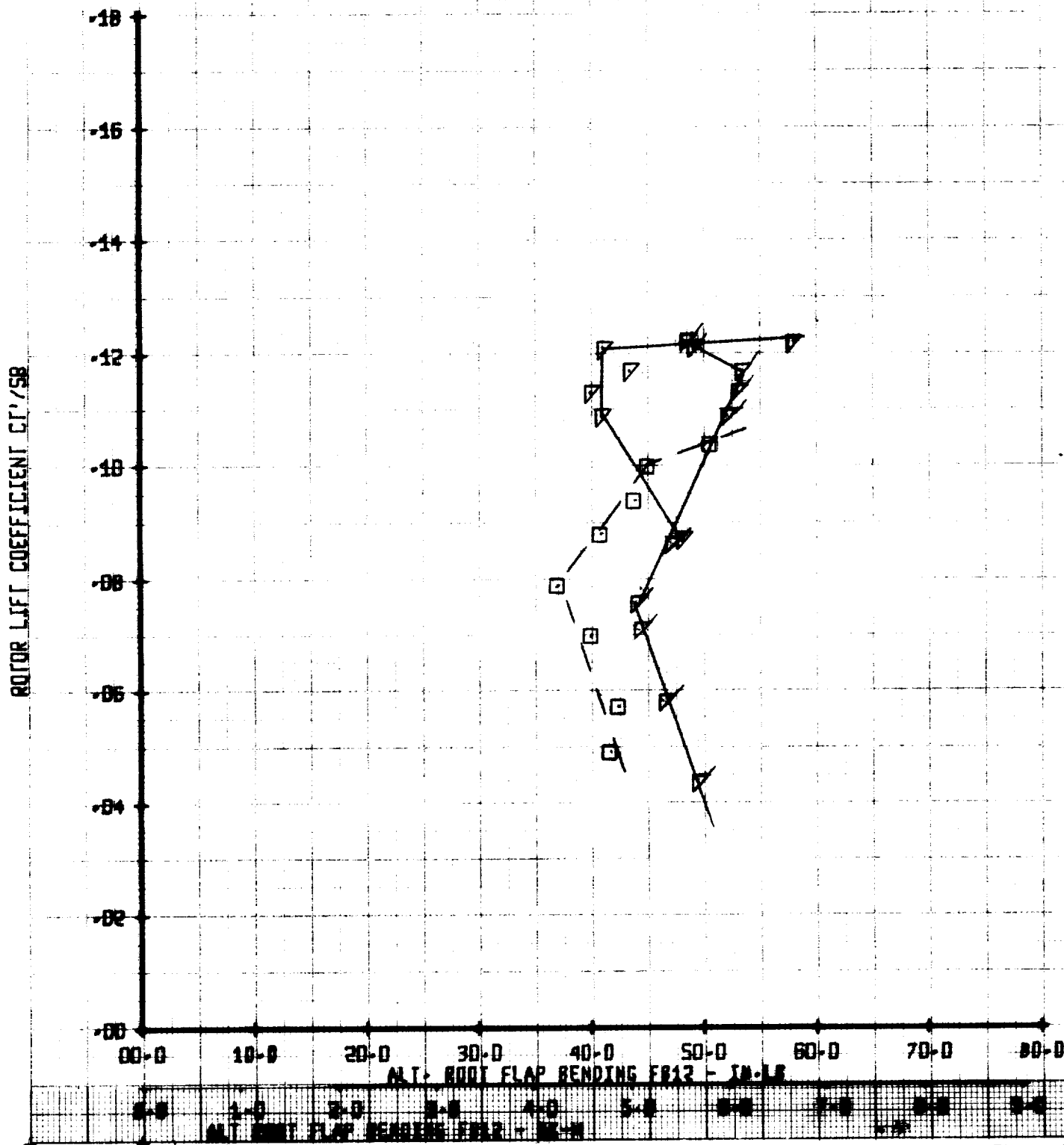
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MLI	X/00298	VTUN
□	251	.45	.05	256
△	255	.45	.05	256

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

REDUCED TIP SPEED

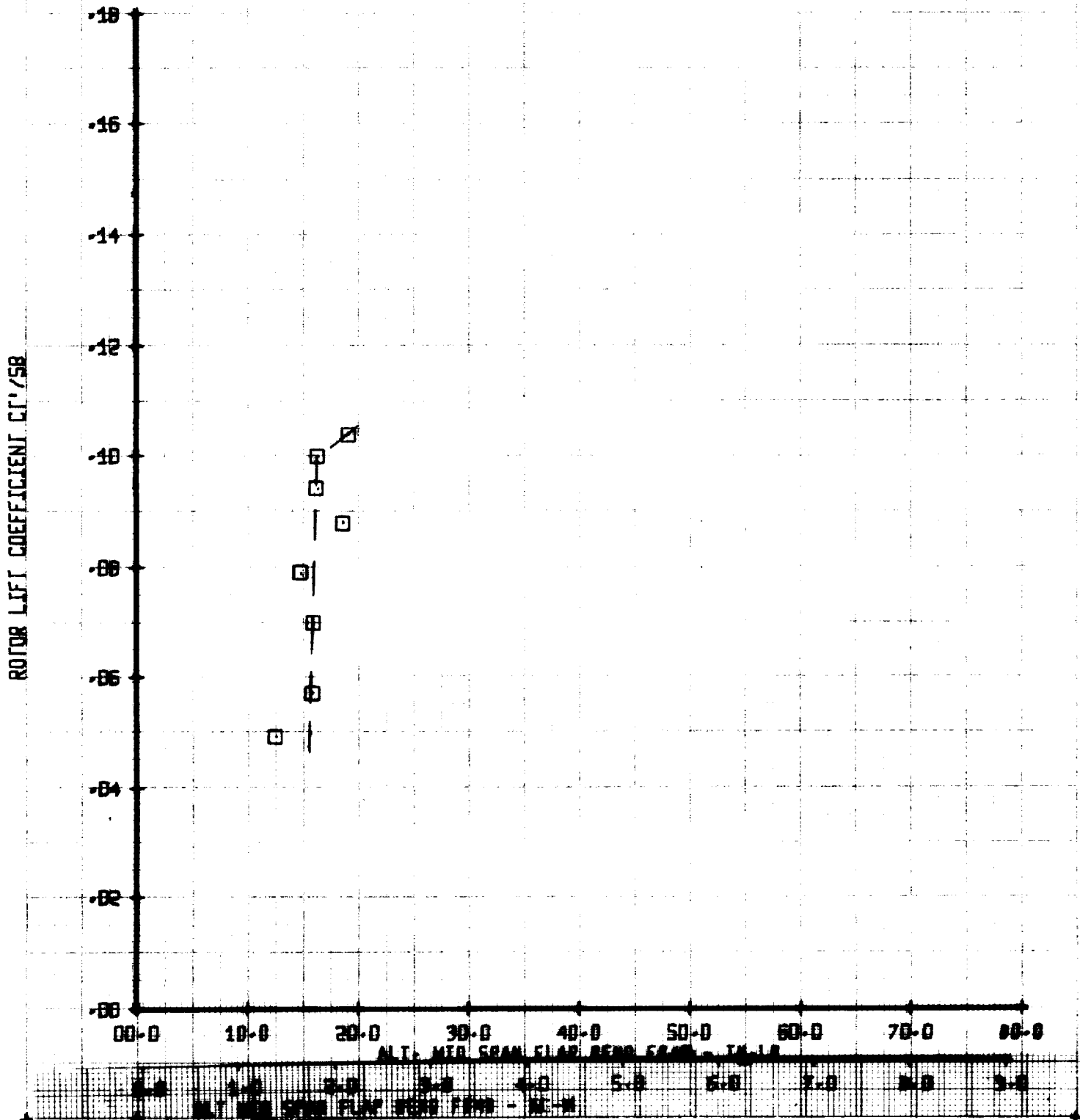


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	VTUN
□	251	.45	.05	256
□	255	.45	.05	256

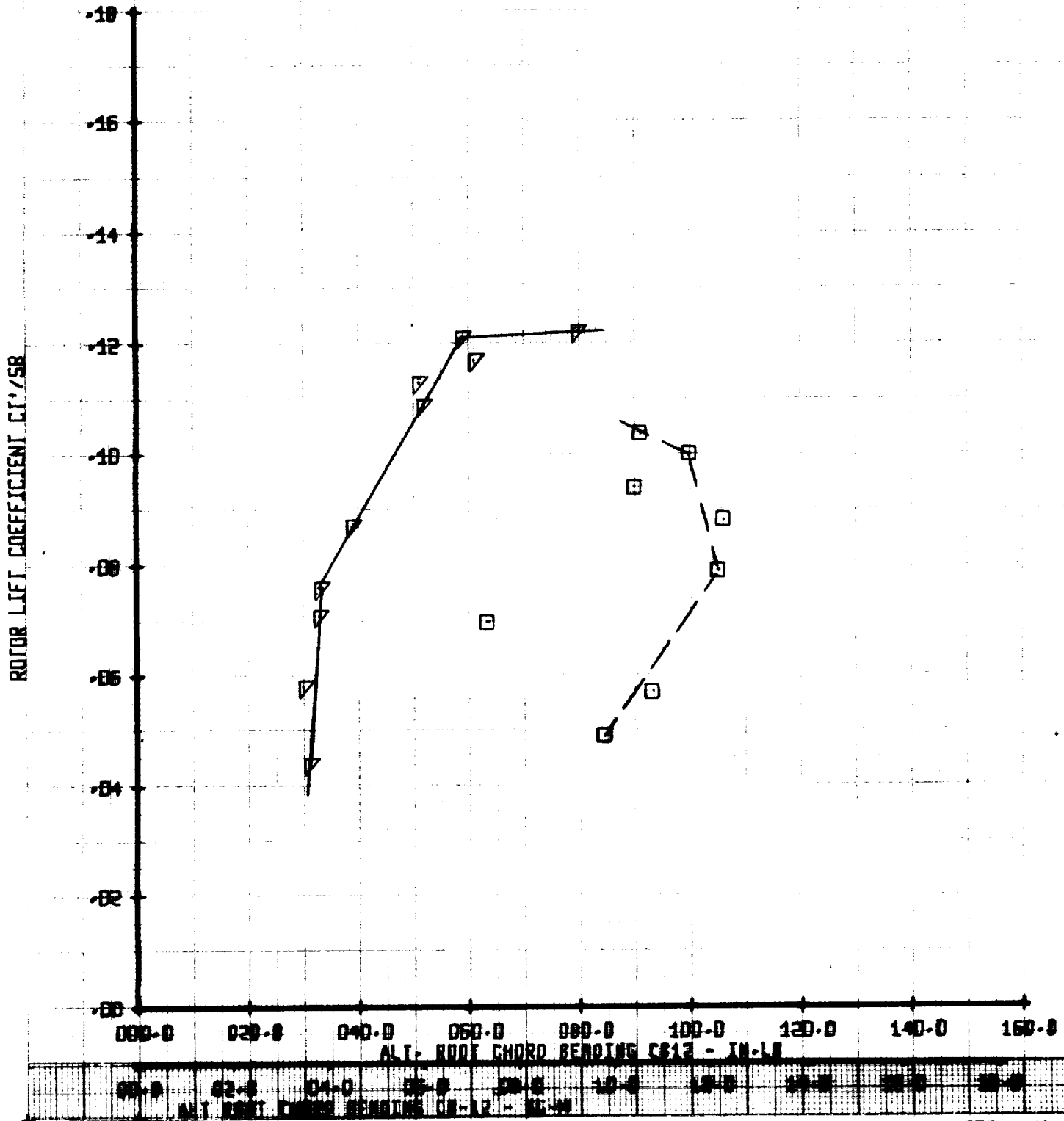
ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN FLAP BENDING FB40
REDUCED TIP SPEED



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM		RUN		MU		X/00258		Y/TUN	
0	0	251	255	.45	.45	.05	.05	256	256

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12
REDUCED TIP SPEED



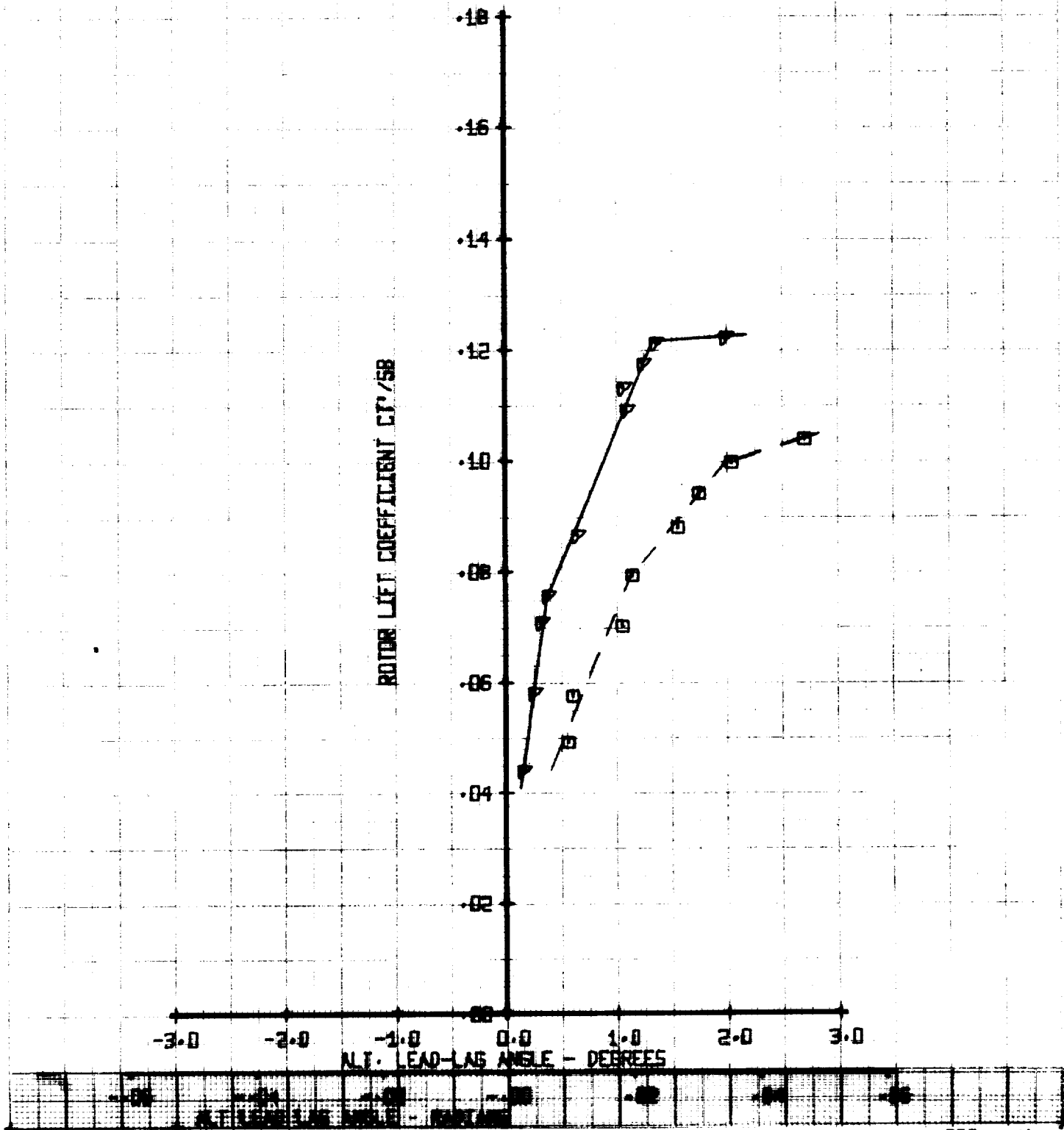
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	QUN	MU'	Y/00258	YTUN
□	251	.45	.05	256
▽	255	.45	.05	256

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE

REDUCED TIP SPEED



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

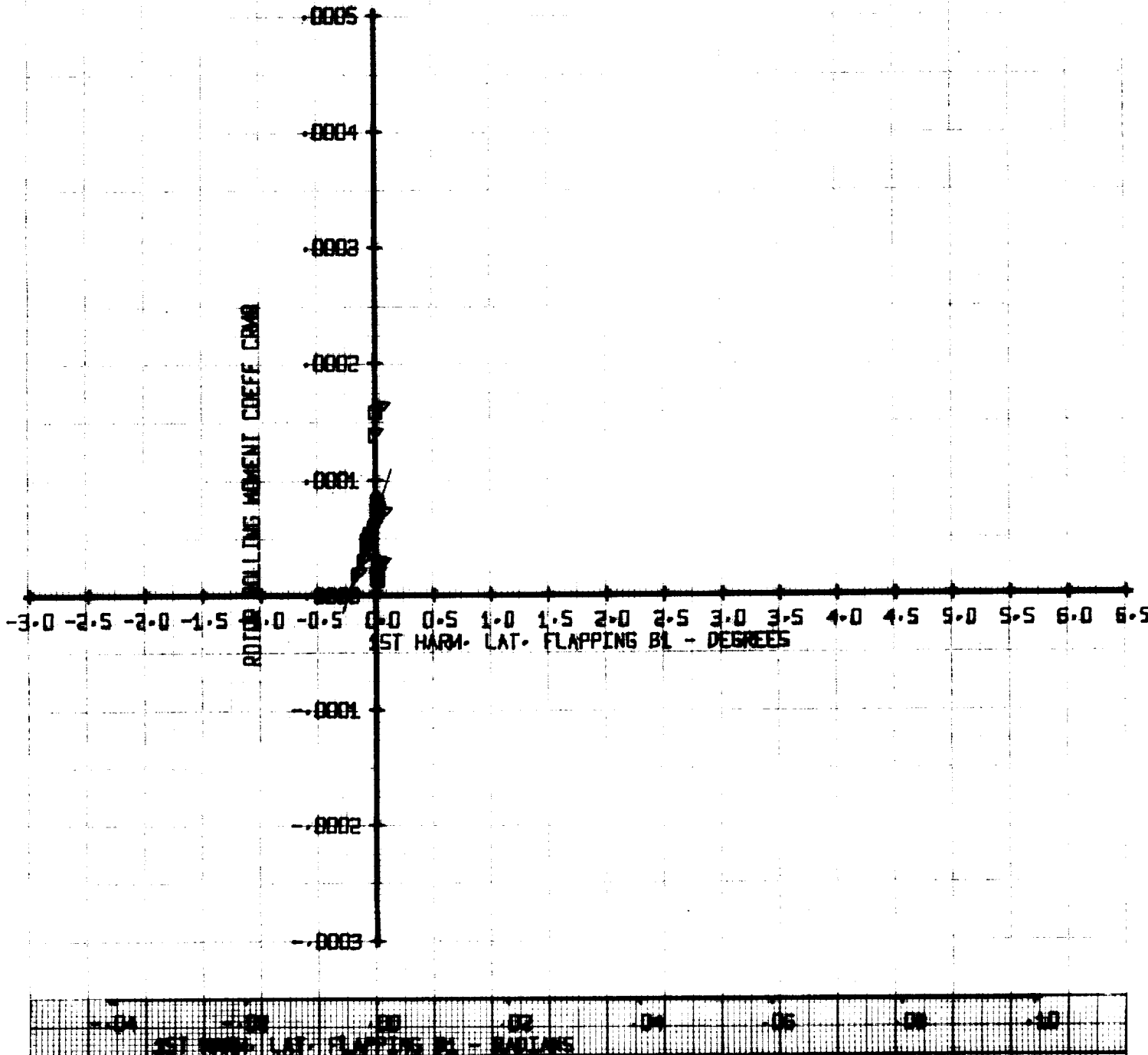
LEGEND

SYM	RUN	MLP	X/100258	Y/RUN
0	251	.45	.05	236
7	255	.45	.05	236

ROTOR ROLLING MOMENT COEFFICIENT
VERSUS

1ST HARMONIC LATERAL FLAPPING B1

REDUCED TIP SPEED

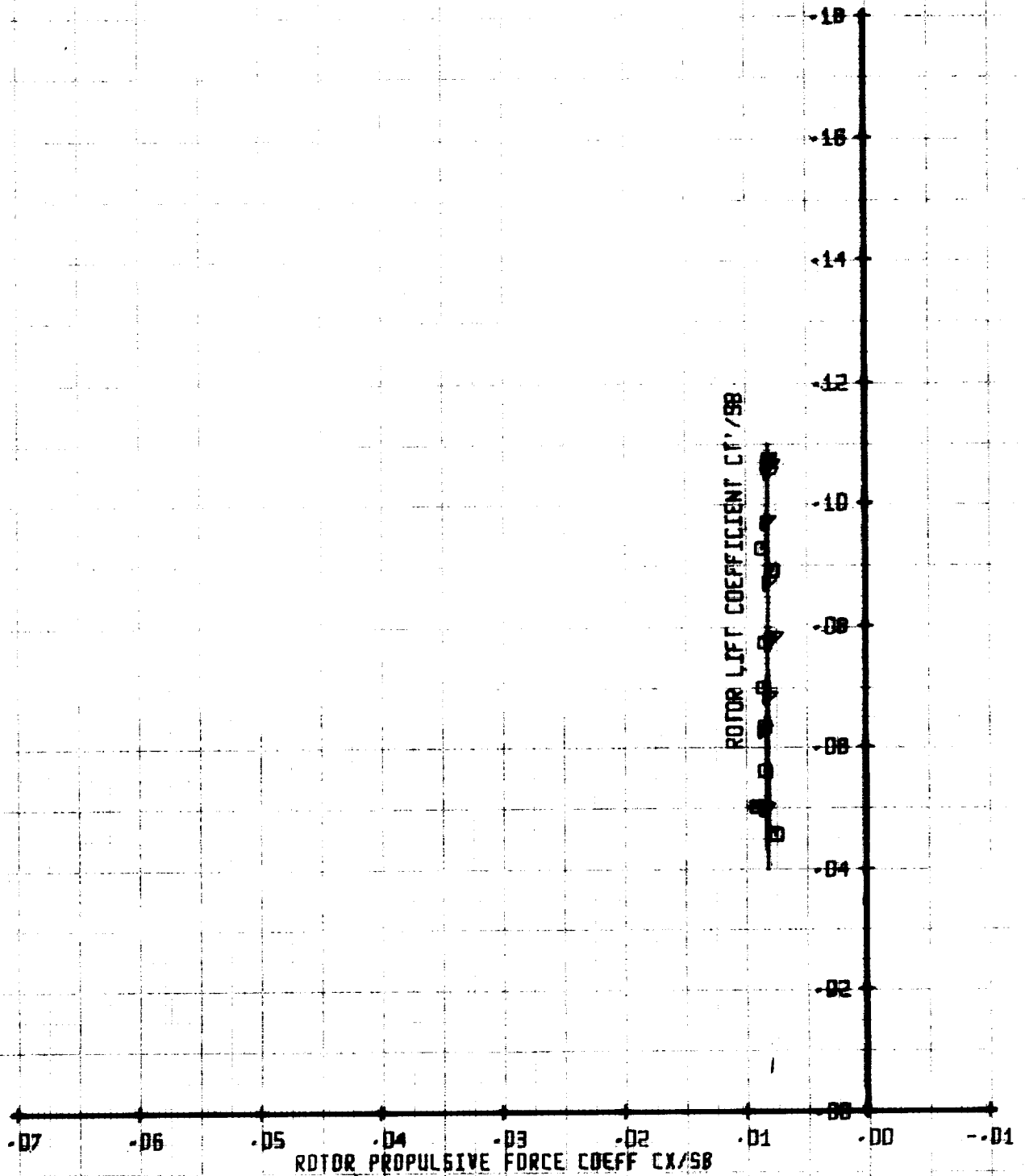


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00298	VILIN
□	252	.50	.05	285
○	254	.50	.05	285

ROTOR LIFT COEFFICIENT
 VERSUS
 ROTOR PROPULSIVE FORCE COEFFICIENT
 REDUCED TIP SPEED

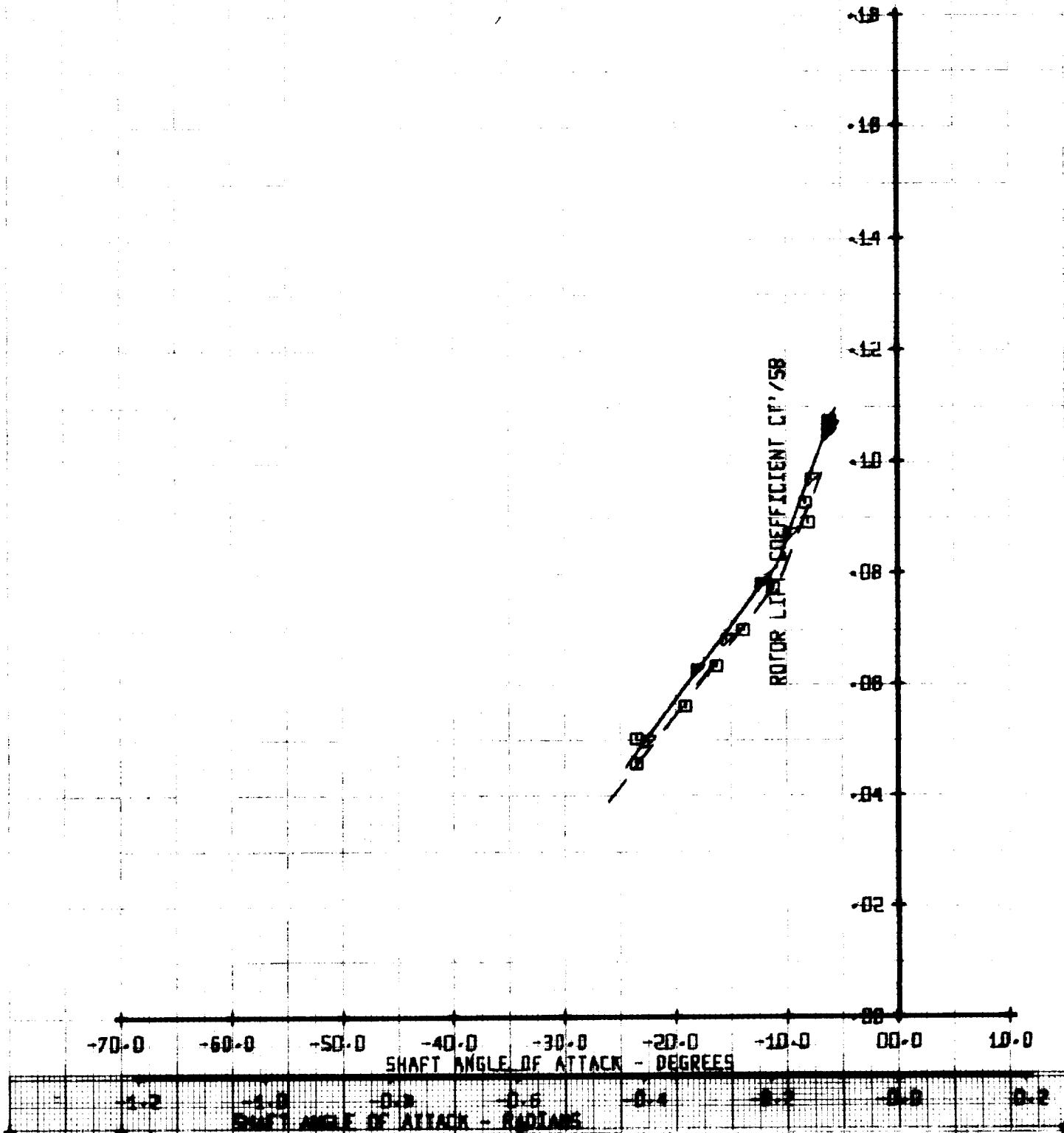


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 LIFT LIMIT TESTING

LEGEND

SYM	RUN	MU'	X/00258	Y/TUN
□	252	.50	.05	285
◇	254	.50	.05	285

ROTOR LIFT COEFFICIENT
 VERSUS
 SHAFT ANGLE OF ATTACK
REDUCED TIP SPEED



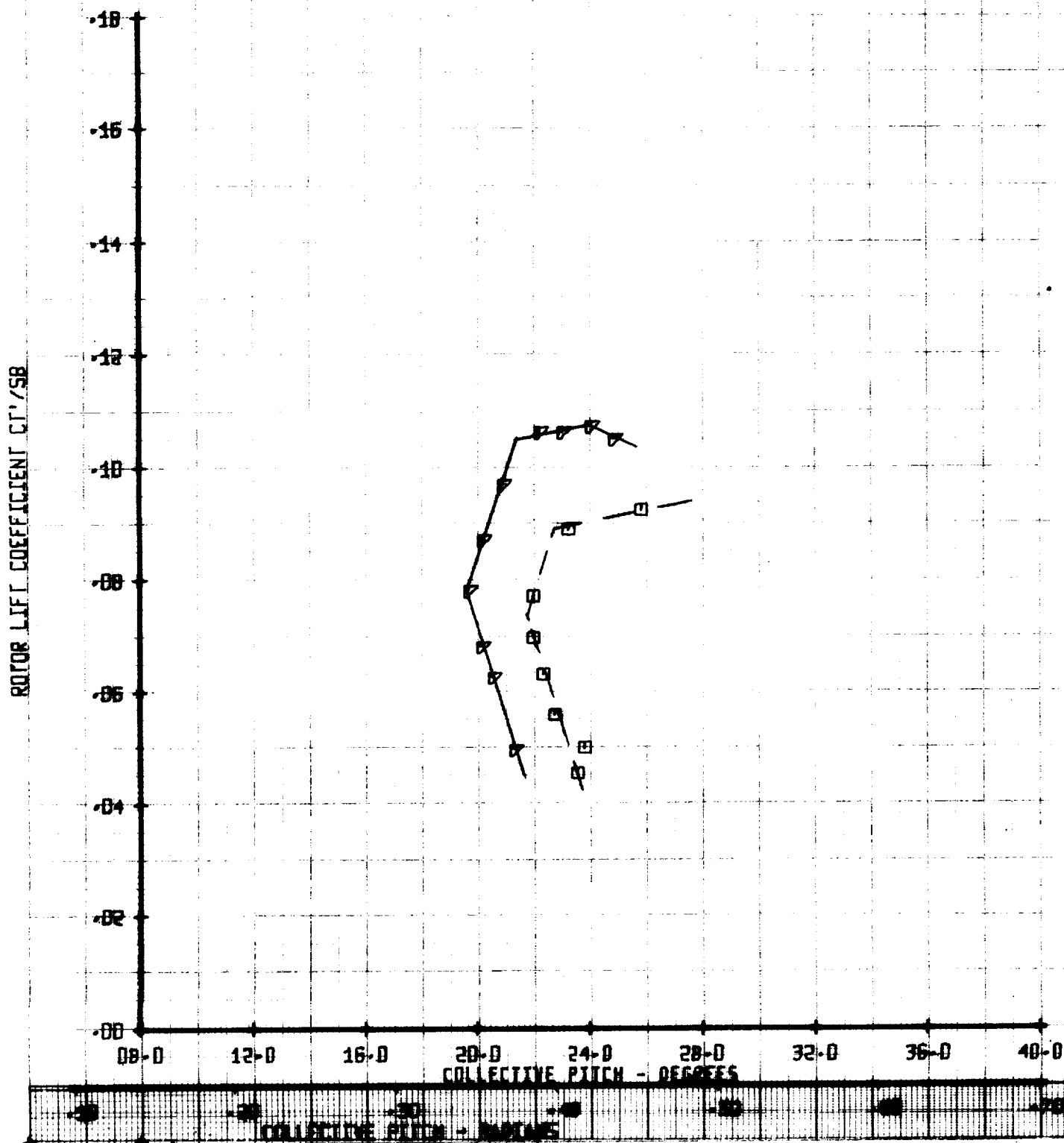
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM
□
△RUN
252
254MU'
.50
.50X/00258
.05
.05VTUN
285
285

ROTOR LIFT COEFFICIENT
VERSUS
COLLECTIVE PITCH

REDUCED TIP SPEED



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

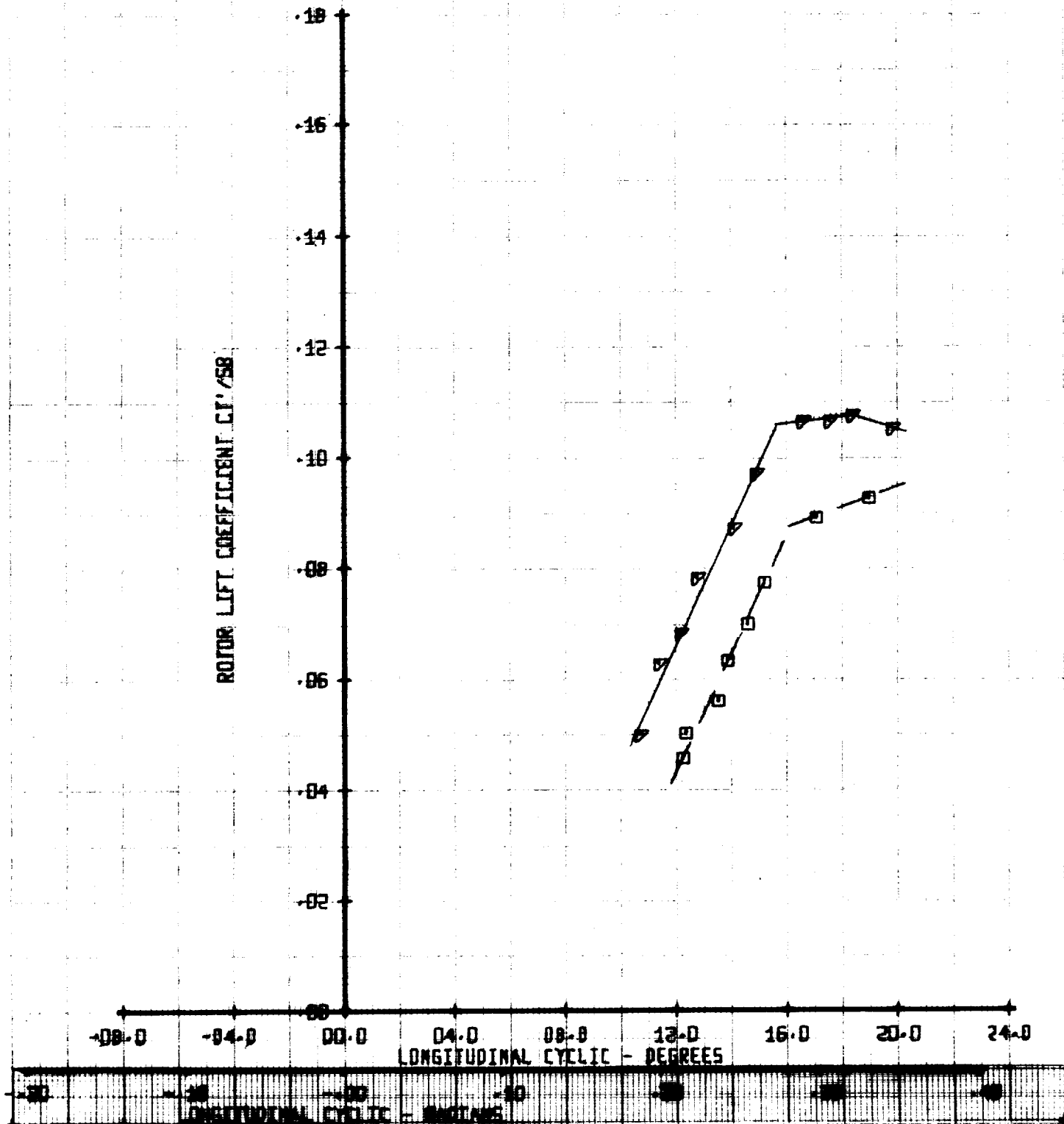
LEGEND

SYM	RUN	ML'	X/DD258	VTUN
□	252	.50	.05	285
▽	254	.50	.05	285

ROTOR LIFT COEFFICIENT
VERSUS
LONGITUDINAL CYCLIC

REDUCED TIP SPEED

ROTOR LIFT COEFFICIENT C_L' / V_{58}



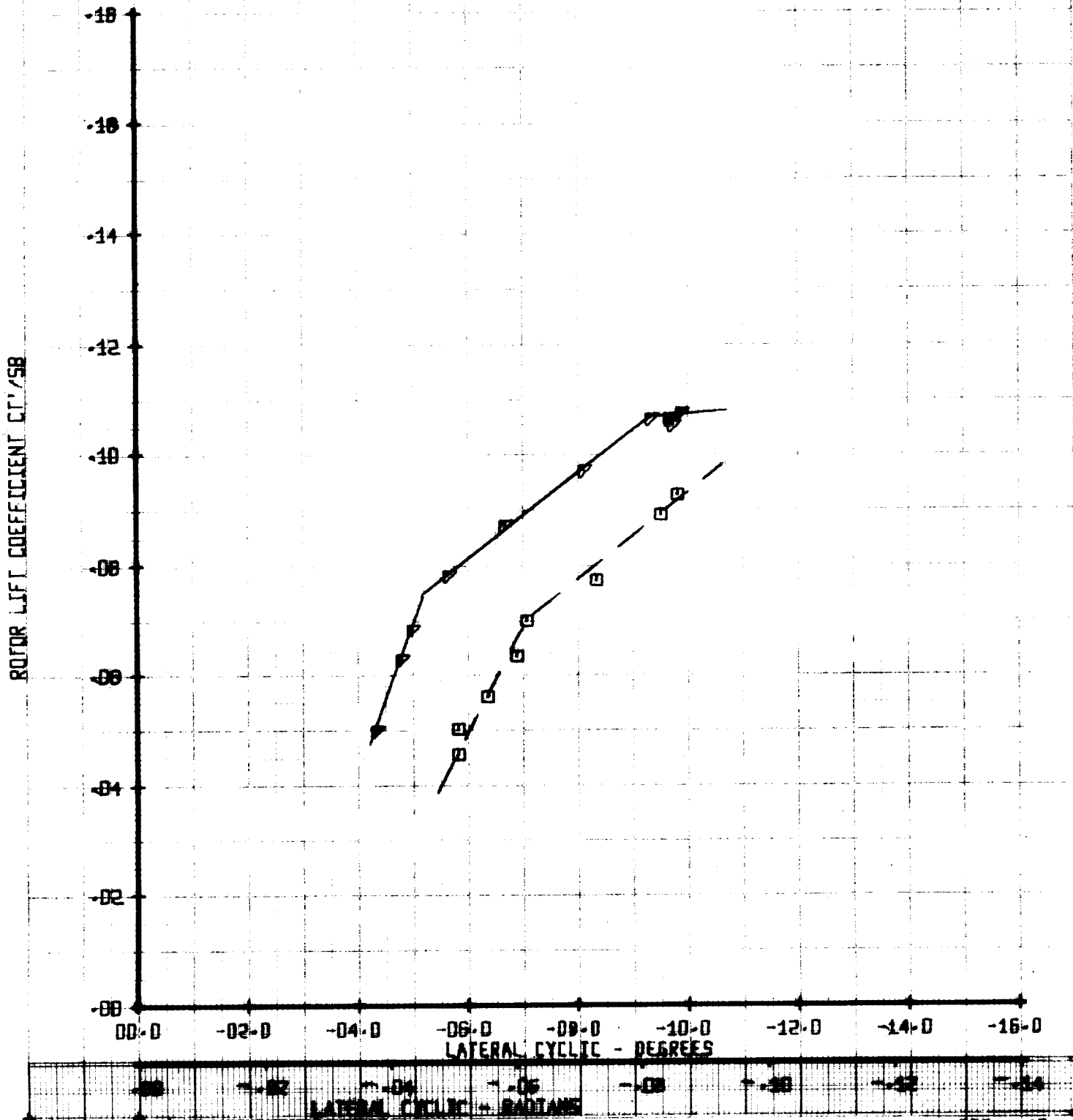
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML'	X/00258	Y/LIN
□	252	.50	.05	285
▽	254	.50	.05	285

ROTOR LIFT COEFFICIENT
VERSUS
LATERAL CYCLIC

REDUCED TIP SPEED



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYM
□
▽

RUN
252
254

LEGEND

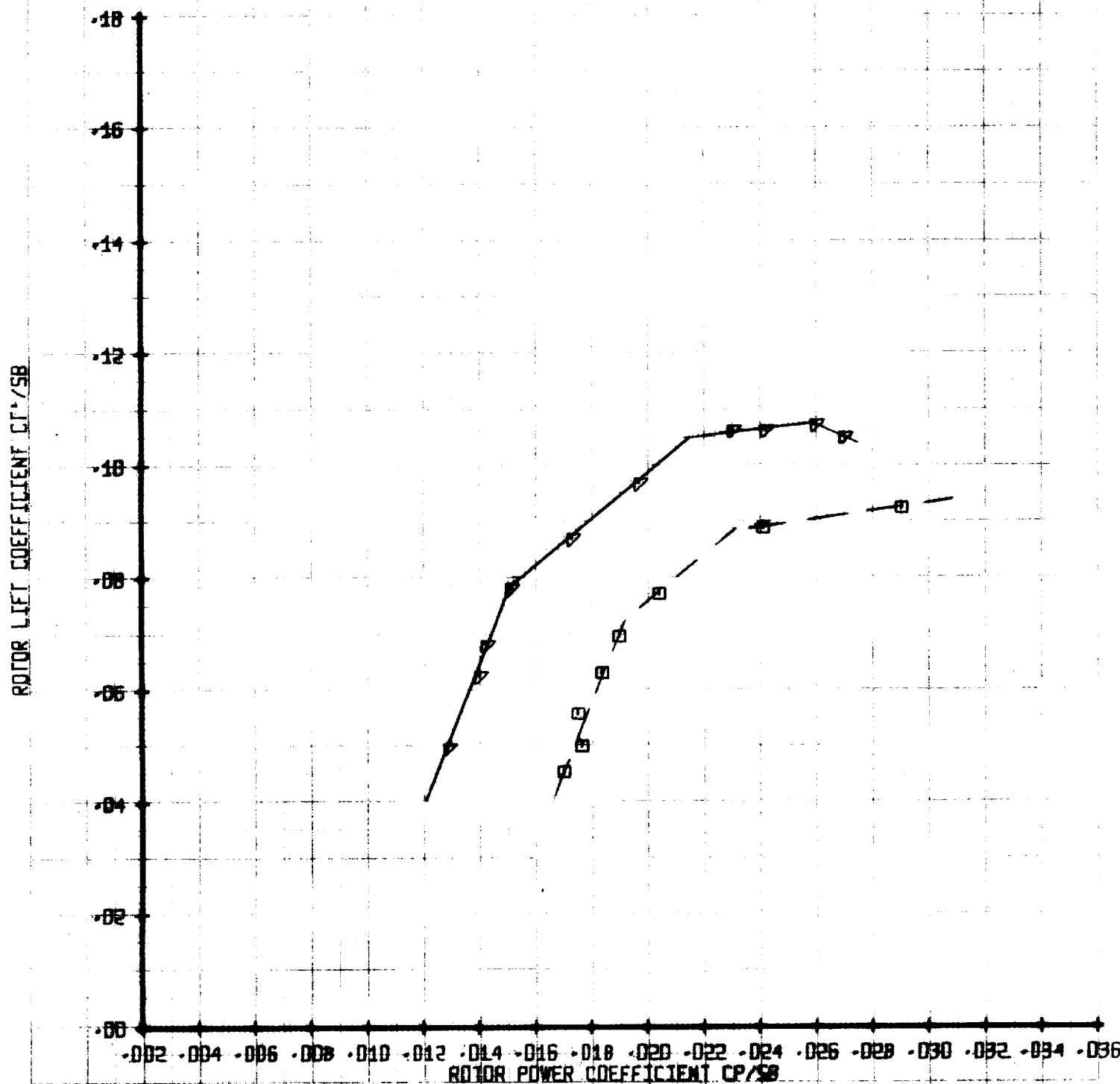
MU
.50
.50

X/00258
.05
.05

VTUN
285
285

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT

REDUCED TIP SPEED



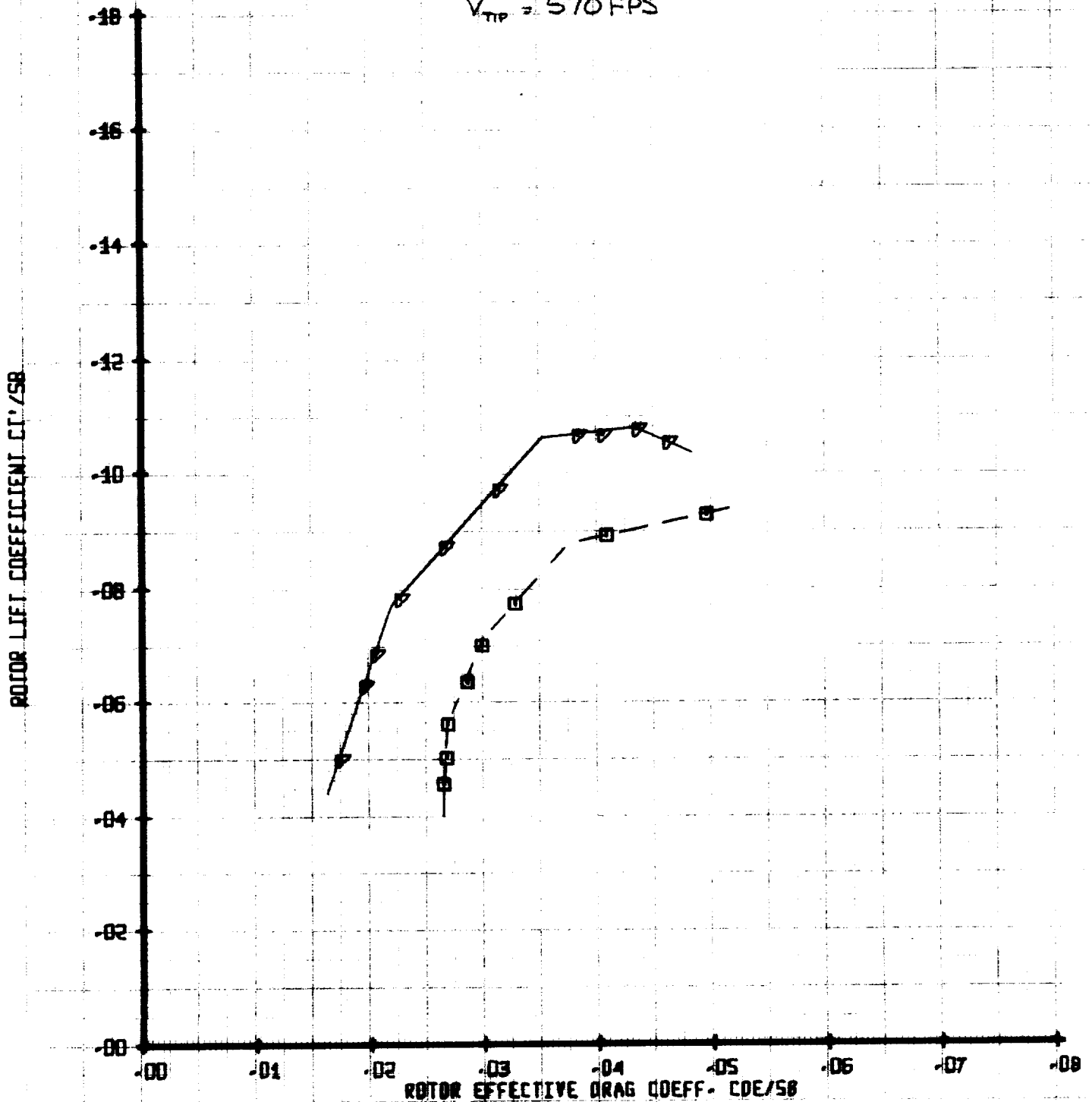
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML	X/100250	VTLM
□	252	.50	.05	285
△	254	.50	.05	285

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR EFFECTIVE DRAG COEFFICIENT
REDUCED TIP SPEED

$V_{TIP} = 570 \text{ FPS}$



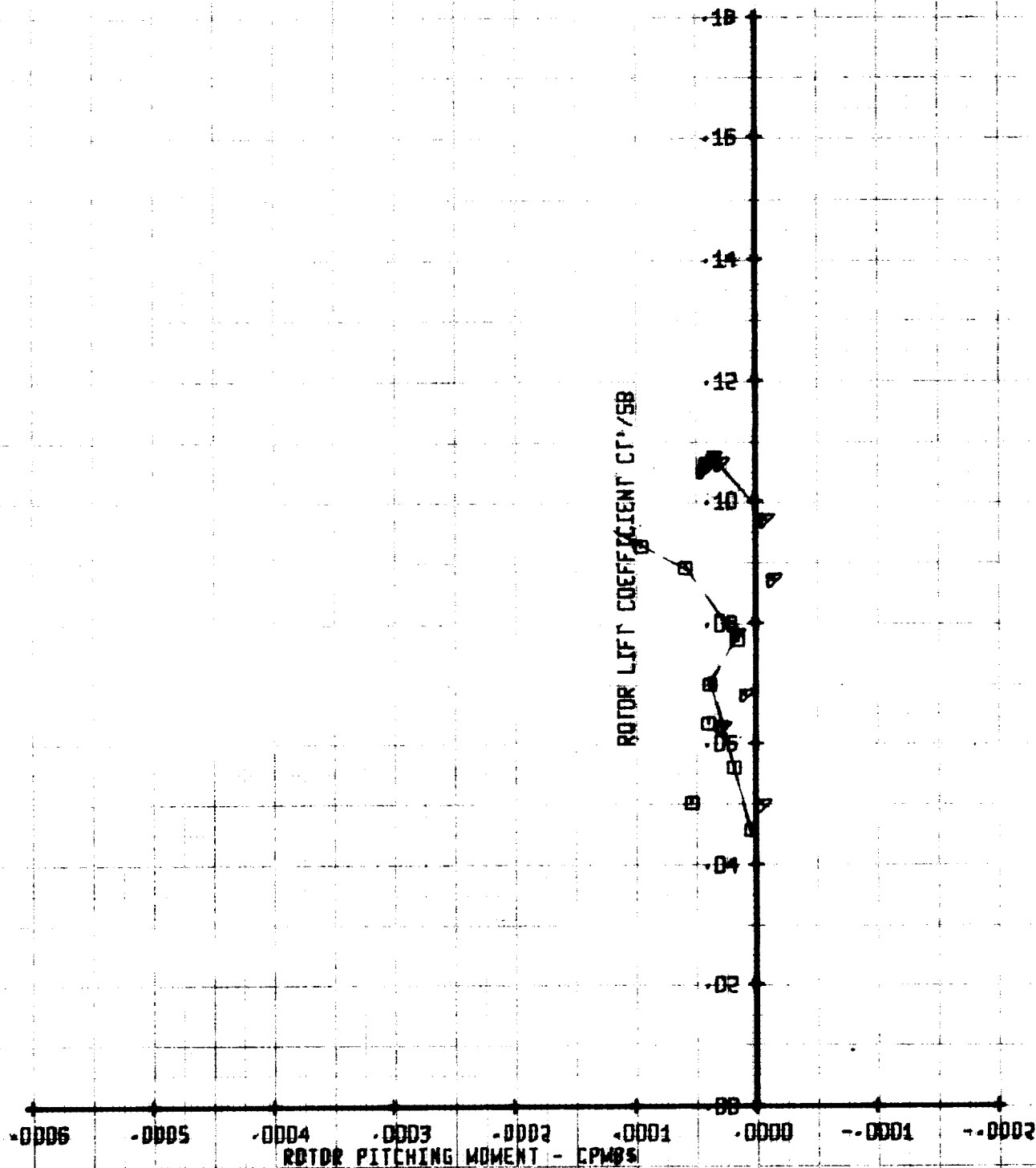
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM
□
▽RUN
252
254MI'
.50
.501/00258
.05
.05VTUR
285
285

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

REDUCED TIP SPEED



SET 42
BVWT 193

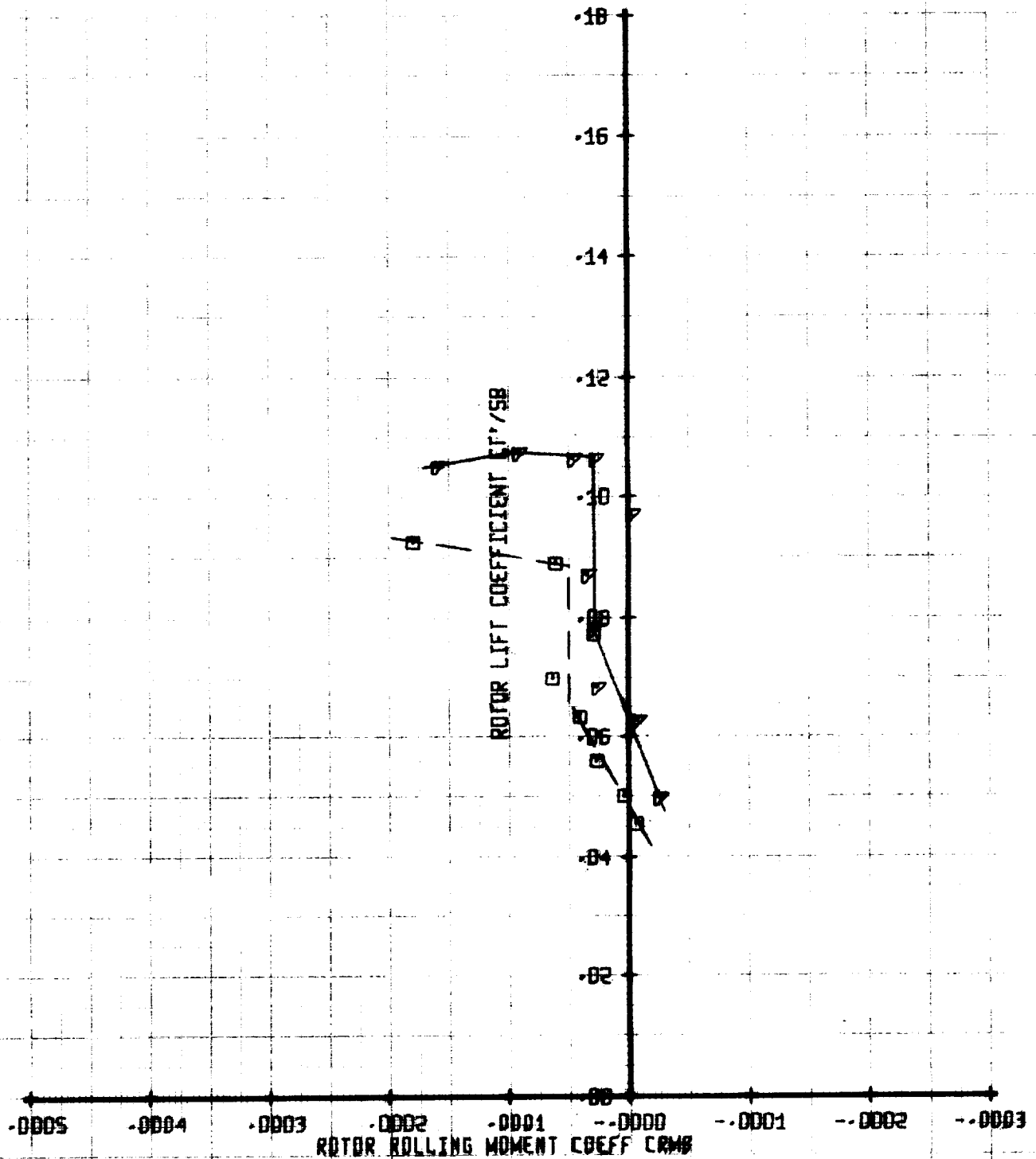
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM
P BRUN
253
254MU'
.50
.50X/00258
.05
.05VTUN
285
285

ROTOR LIFT COEFFICIENT
VERSUS

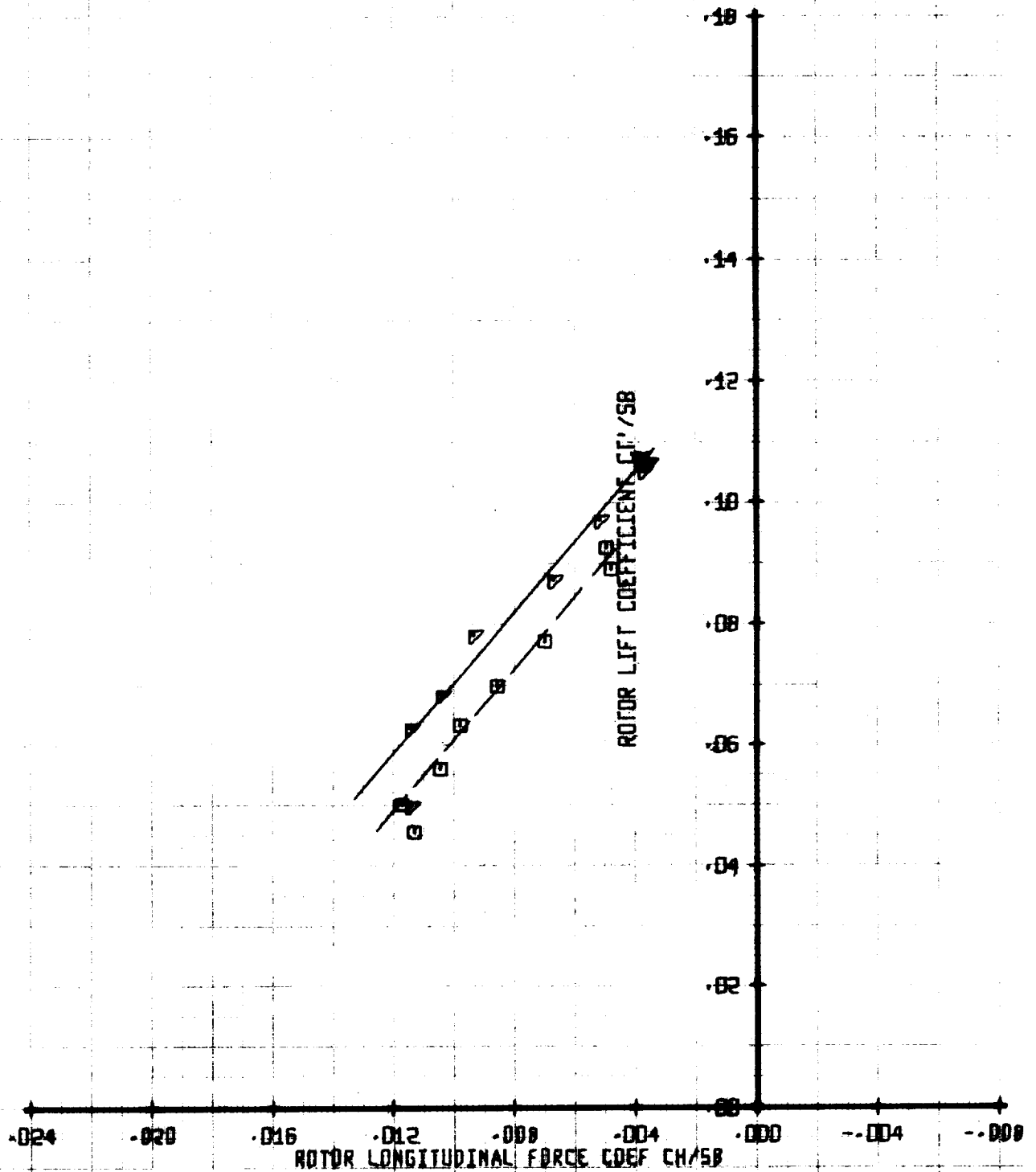
ROTOR ROLLING MOMENT COEFFICIENT

REDUCED TIP SPEED

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND		X/00258	VTUN
SYM	RUN	MU*	
□	252	.50	285
△	254	.50	285

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT
REDUCED TIP SPEED

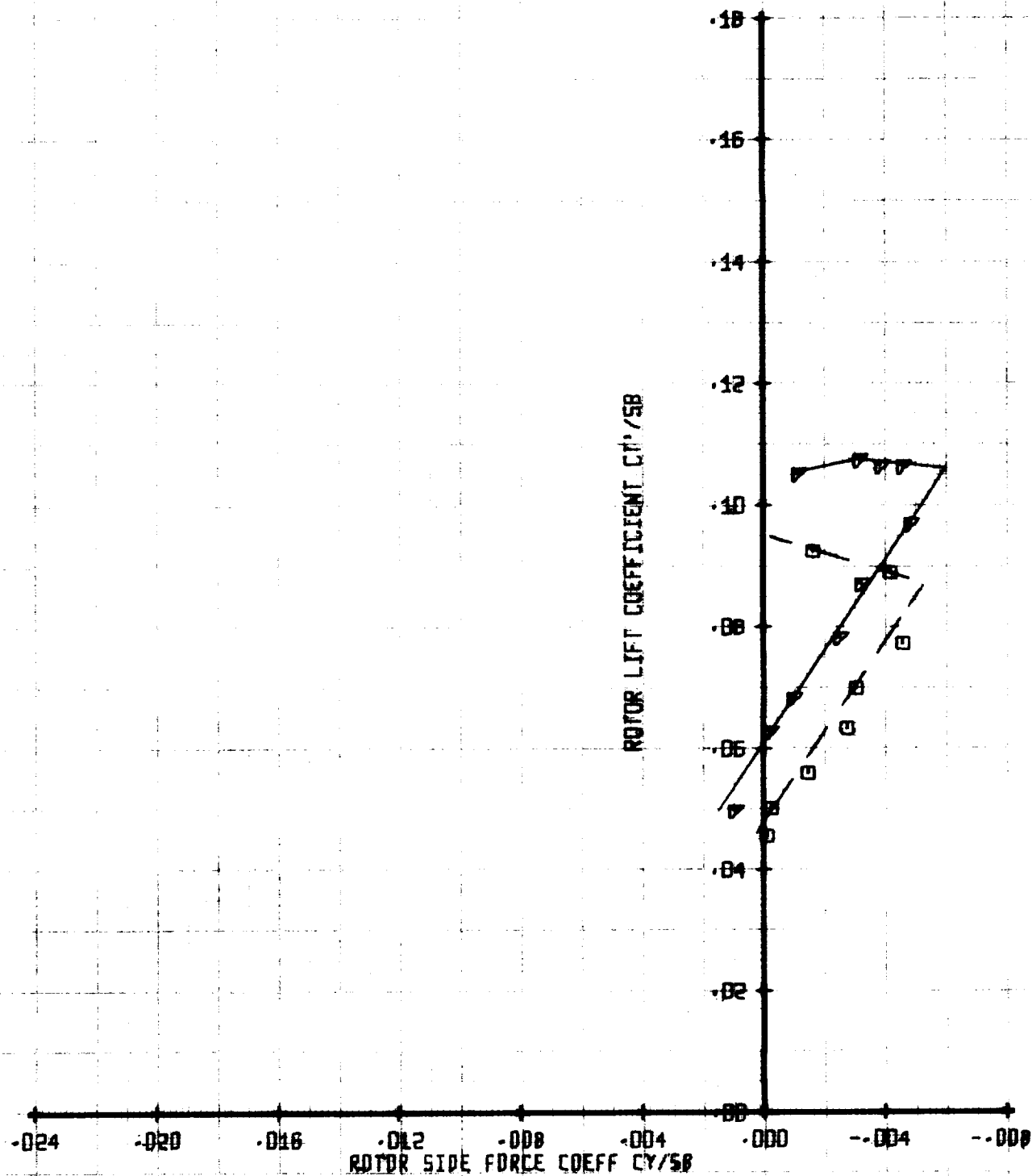


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM
□
▽RUN
252
254MU'
.50
.50X/00258
.05
.05VTUN
285
285

ROTOR LIFT COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT
REDUCED TIP SPEED

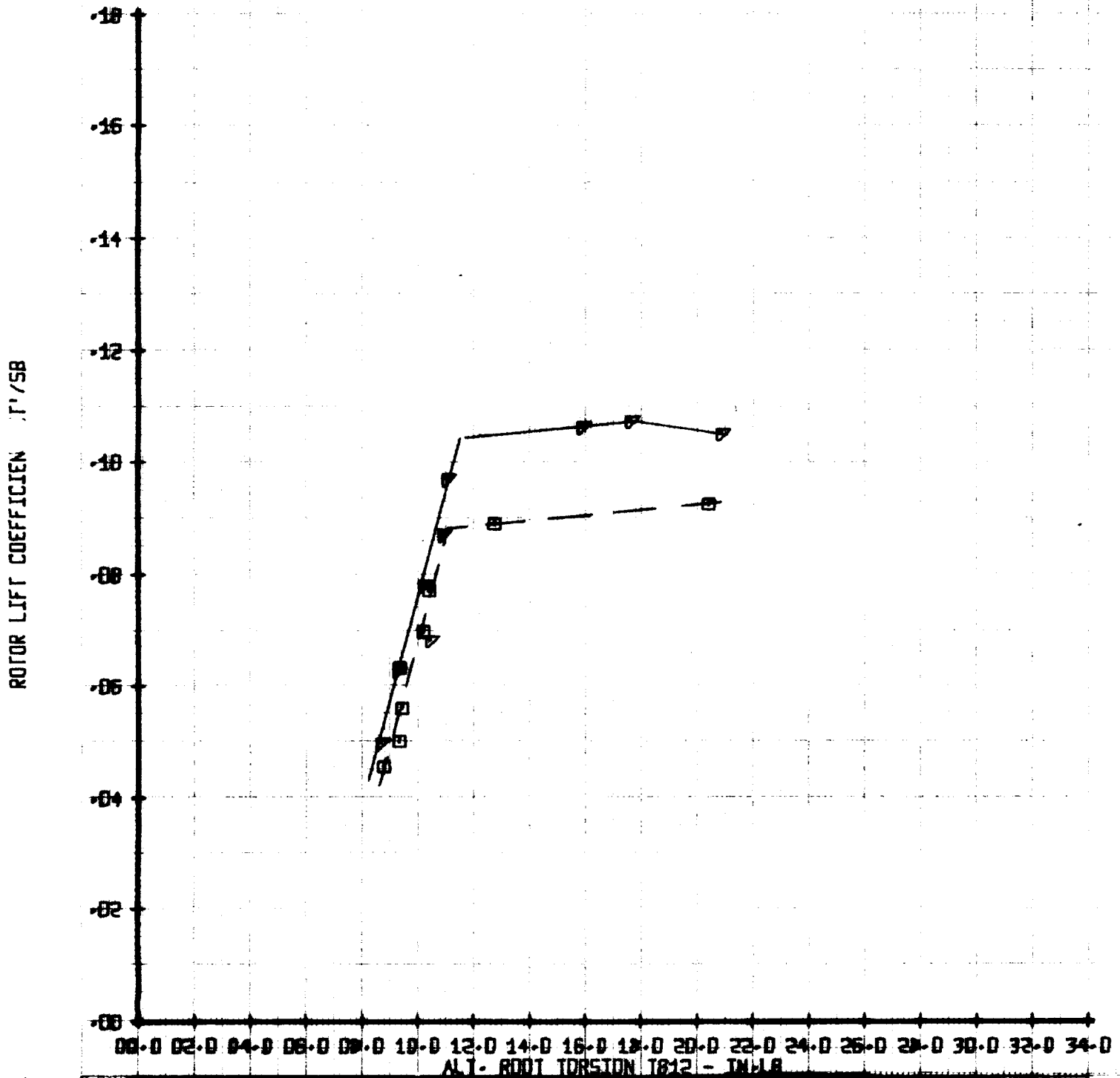


SET 42
BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND		MI'	X/00258	VTUN
SYM	RUN	.90	.05	285
4	252	.90	.05	285

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12
REDUCED TIP SPEED

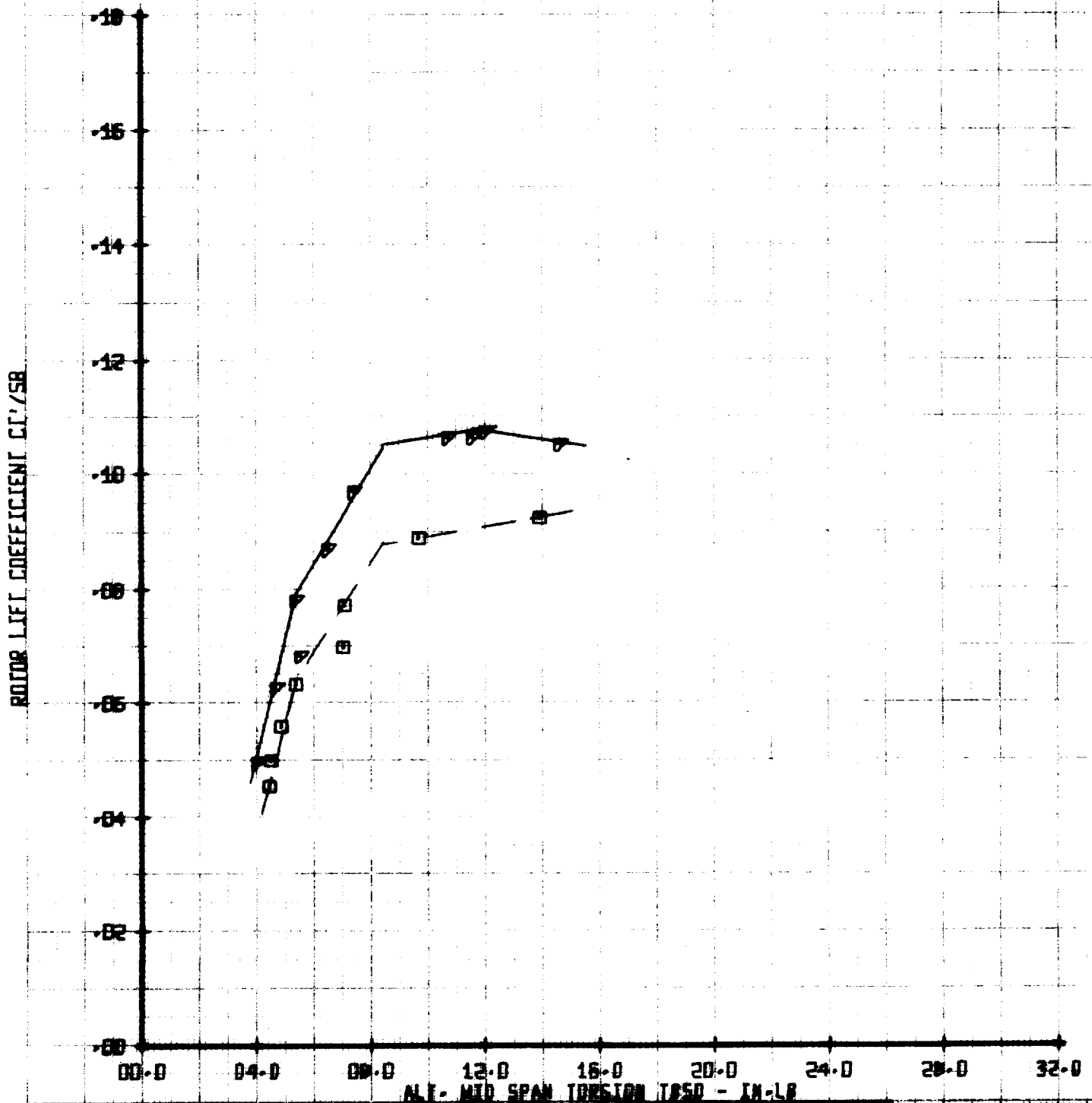


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	ML	X/00258	Y/TUN
0	252	.50	.05	205
0	254	.50	.05	205

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50
REDUCED TIP SPEED

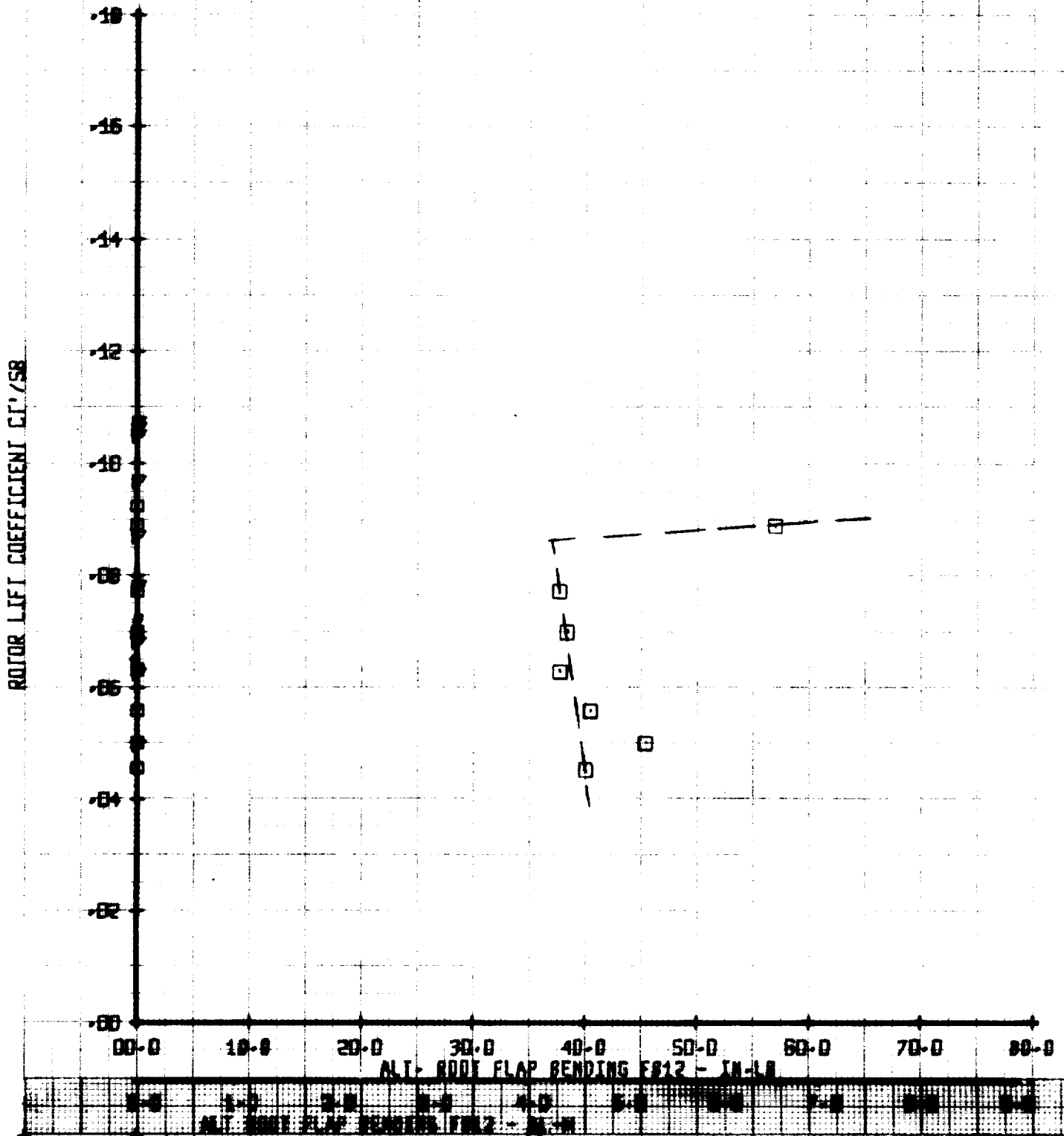


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47H ROTOR
LIFT LIMIT TESTING

LEGEND

SYM	RUN	MLA	1/00258	VTUN
□	252	.90	.05	285
△	254	.90	.05	285

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12
REDUCED TIP SPEED

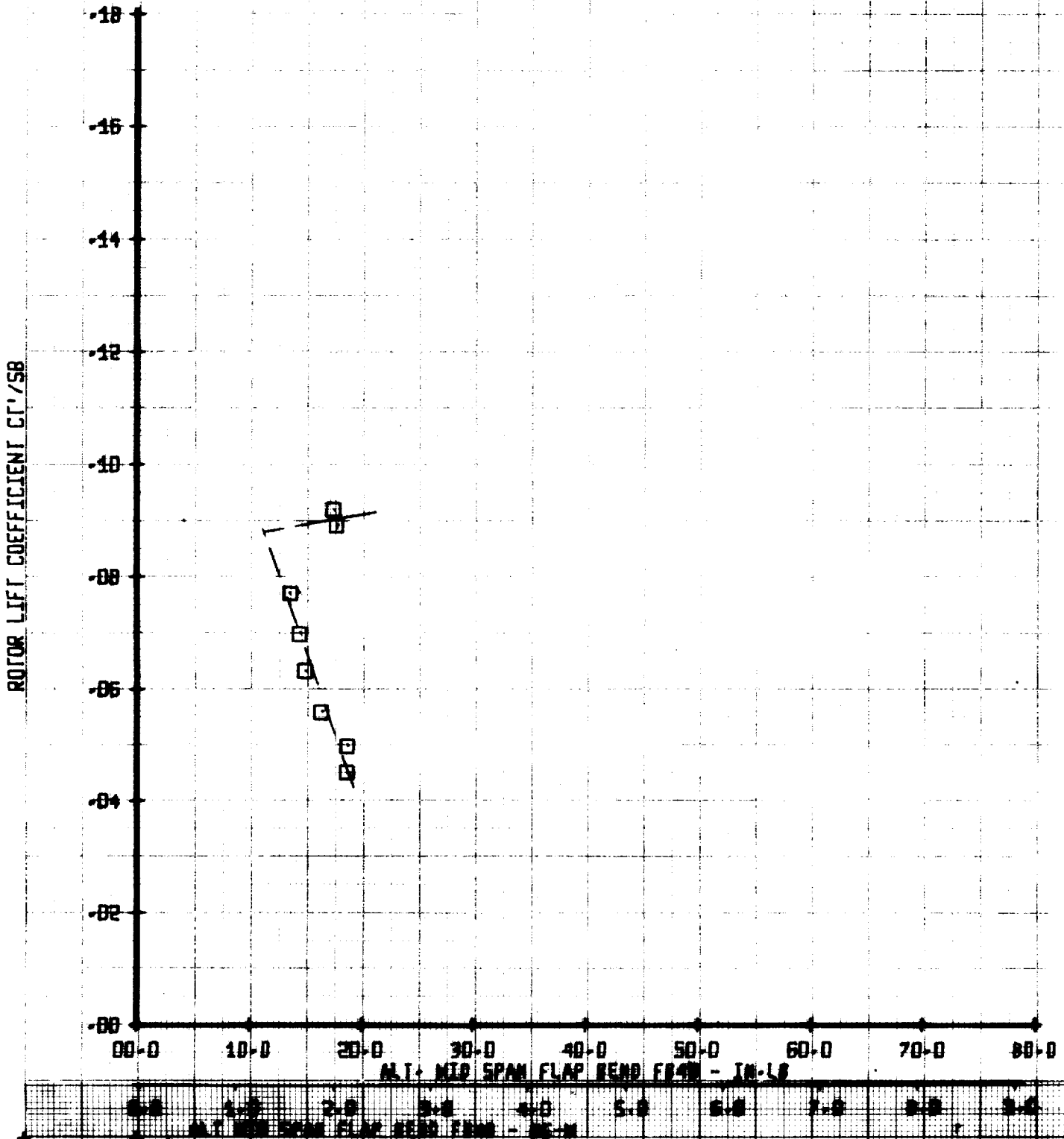


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

LEGEND

SYM
O
PRUN
252
254MU
.50
.50X/00258
.05
.05VTUN
285
285

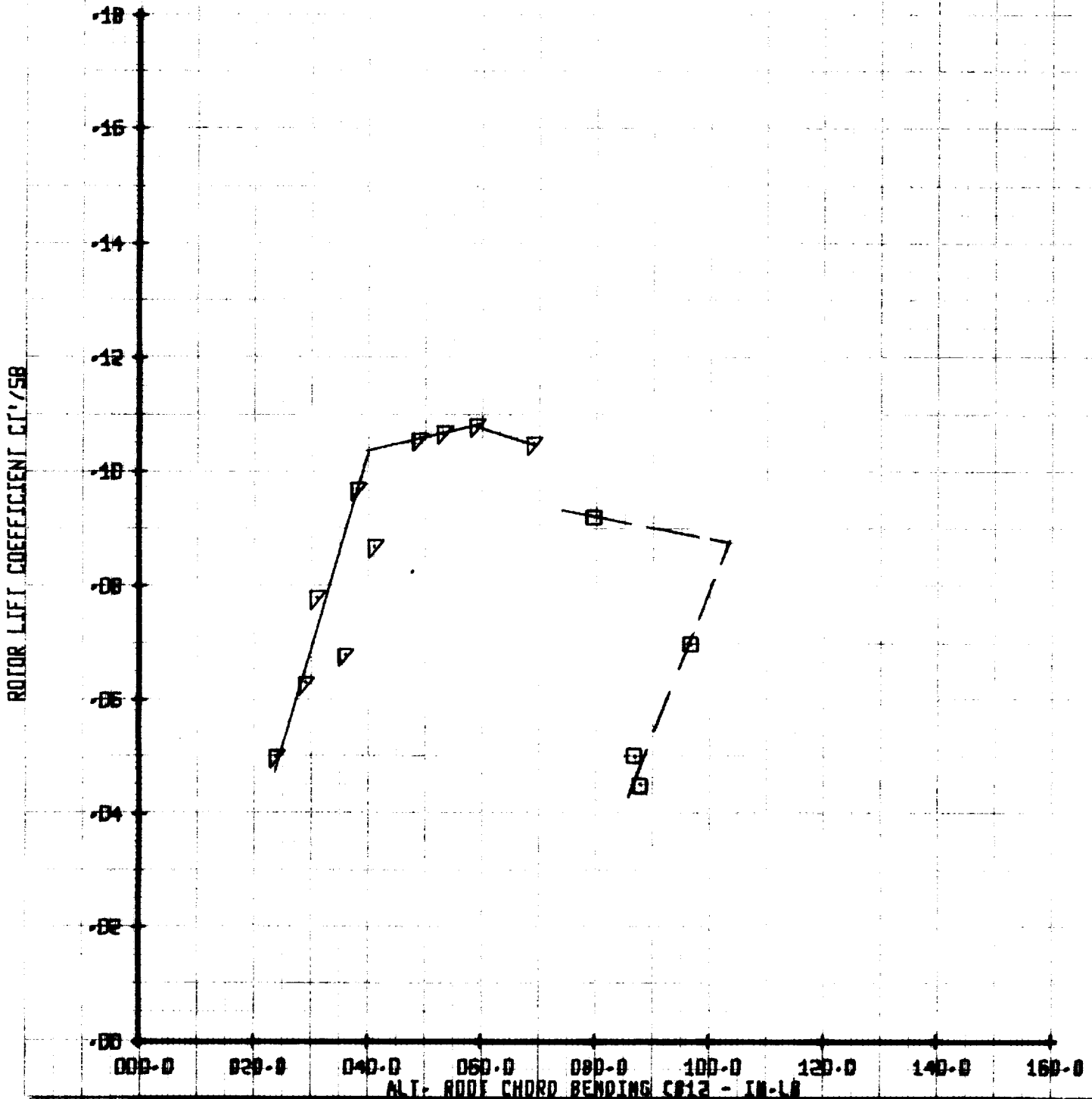
ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING MID SPAN FLAP BENDING FB40
REDUCED TIP SPEED



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
LIFT LIMIT TESTING

SYN		LEGEND		X/00258		VTUN	
□	252	MU'	.50	.05	295		
△	254		.50	.05	295		

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12
REDUCED TIP SPEED



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OY-475 ROTOR
LIFT LIMIT TESTING

LEGEND

SYM
□
△

RUN
282
284

MU'
0.50
0.50

X/00258
0.05
0.05

YTUN
285
285

ROTOR LIFT COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE

REDUCED TIP SPEED

ROTOR LIFT COEFFICIENT $C_L/58$

-3.0 -2.0 -1.0 0.0 1.0 2.0 3.0
ALT. LEAD-LAG ANGLE - DEGREE

ALT. LEAD-LAG ANGLE - RADIANS

ET 42
WT 193

B. Basic Test Data from Propulsive Force Limit Testing

As indicated in Section 5 of the main report, the propulsive force limit testing was conducted at fixed levels of rotor lift by increasing the collective pitch, decreasing the rotor shaft angle of attack and trimming the hub moments to zero with longitudinal and lateral cyclic. This was repeated at each level of rotor lift level and advance ratio for the basic rotor tip speed of 620 ft/sec. A limited amount of testing was also accomplished at a tip speed of 665 ft/sec.

The test data obtained for each of these test runs has been combined to show the impact of rotor lift at a fixed advance ratio. The combinations identified as plot sets, are defined in Table B-1 and are marked on the bottom of each sheet. Within each plot set area a series of graphs presenting the variation of each component of measured data with rotor propulsive force coefficient. The sequence of these graphs are as follows:

Propulsive Force Coefficient versus Rotor Propulsive Force Coefficient

Propulsive Force Coefficient versus Shaft Angle of Attack

Propulsive Force Coefficient versus Collective Pitch

Propulsive Force Coefficient versus Longitudinal Cyclic

Propulsive Force Coefficient versus Lateral Cyclic

Propulsive Force Coefficient versus Rotor Power Coefficient

Propulsive Force Coefficient versus Rotor Pitching Moment

Propulsive Force Coefficient versus Rotor Rolling Moment Coefficient

Propulsive Force Coefficient versus Rotor Longitudinal Force Coefficient

Propulsive Force Coefficient versus Rotor Side Force Coefficient

Propulsive Force Coefficient versus Alternating Root Torsion TB12

Propulsive Force Coefficient versus Alternating Mid Span Torsion TB50

Propulsive Force Coefficient versus Alternating Outboard Torsion TB80

Propulsive Force Coefficient versus Alternating Root Flap Bending FB12

Propulsive Force Coefficient versus Alternating Mid Span Flap Bending FB47

Propulsive Force Coefficient versus Alternating Outboard Flap Bending FB78

Propulsive Force Coefficient versus Alternating Root Chord Bending CB12

Propulsive Force Coefficient versus Coning Angle

Propulsive Force Coefficient versus 1st Harmonic Longitudinal Flapping A1

Propulsive Force Coefficient versus 1st Harmonic Lateral Flapping B1

Propulsive Force Coefficient versus Alternating Lead-Lag Angle

Rotor Pitching Moment Coefficient versus 1st Harmonic Longitudinal Flapping A1

Rotor Rolling Moment Coefficient versus 1st Harmonic Lateral Flapping B1

TABLE B-1 DATA PLOTTING SUMMARY FOR PROPULSIVE FORCE LIMIT TESTING

PLOT SET	RUN NO.	ROTOR TIP SPEED V_T	ADVANCE RATIO μ	ROTOR LIFT COEFF. G_L/σ	ROTOR PROPULSIVE FORCE COEFF. $X/qd^2\sigma$	TUNNEL SPEED V	COMMENTS
47	230	620FPS	.40	.06	Range	248FPS	Cruise performance and propulsive force limit.
	231	620FPS	.40	.09	Range	248FPS	
48	243	620FPS	.45	.06	Range	279FPS	
	244	620FPS	.45	.076	Range	279FPS	
49	232	620FPS	.50	.06	Range	311FPS	
	233	620FPS	.50	.06	Range	311FPS	
	234	620FPS	.50	.08	Range	311FPS	
	235	620FPS	.50	.08	Range	311FPS	
50	269	620FPS	.50	.06	Range	311FPS	
	270	620FPS	.50	.07	Range	311FPS	
	271	620FPS	.50	.09	Range	311FPS	
	272	620FPS	.50	.10	Range	311FPS	
51	268	620FPS	.53	.05	Range	328FPS	
	240	620FPS	.53	.06	Range	328FPS	
	266	620FPS	.53	.08	Range	328FPS	
	241	620FPS	.53	.09	Range	328FPS	
	242	620FPS	.53	.09	Range	328FPS	
	267	620FPS	.53	.10	Range	328FPS	
52	264	620FPS	.53	.05	Range	328FPS	
	265	620FPS	.53	.07	Range	328FPS	

TABLE B-1 DATA PLOTTING SUMMARY FOR PROPULSIVE FORCE LIMIT TESTING
(Continued)

PLOT SET	RUN NO.	ROTOR TIP SPEED V_T	ADVANCE RATIO μ	ROTOR LIFT COEFF. G_T/σ	ROTOR PROPULSIVE FORCE COEFF. $X/qd^2\sigma$	TUNNEL SPEED V	COMMENTS
53	236	620FPS	.57	.06	Range	353FPS	Cruise performance and propulsive force limit.
	237	620FPS	.57	.076	Range	353FPS	
54	239	620FPS	.61	.04	Range	378FPS	
	238	620FPS	.61	.055	Range	378FPS	
55	276	665FPS	.53	.06	Range	352FPS	Cruise performance and force limit at increased tip speed.
	277	665FPS	.53	.08	Range	352FPS	

Figure B-1

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'58	VTUN
□	230	.40	.06	24B
◻	231	.40	.09	24B

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PROPULSIVE FORCE COEFFICIENT

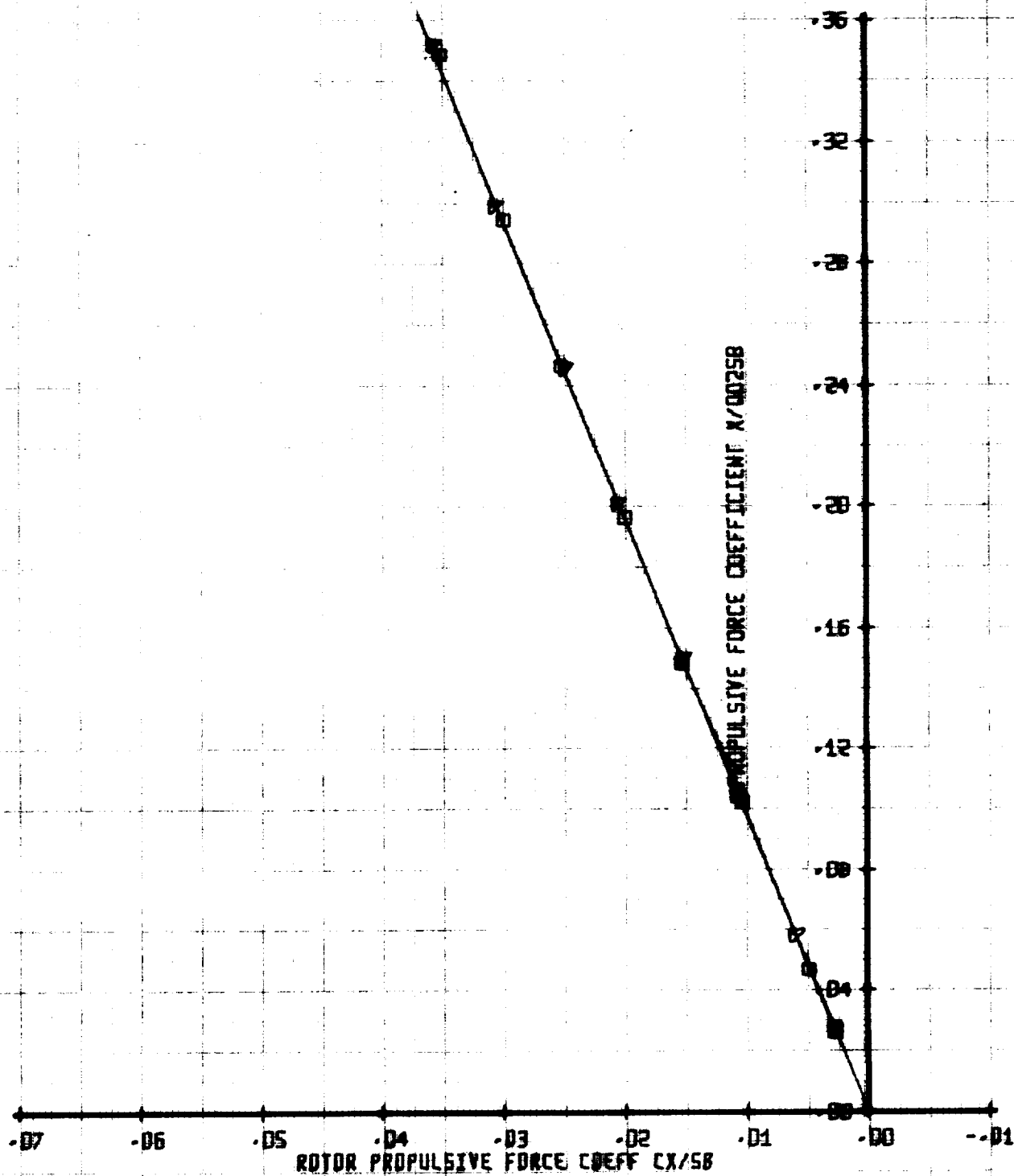


Figure B-2

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND				
SYM	RUN	MU'	CT'/SB	VTUN
□	230	.40	.06	248
▽	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK

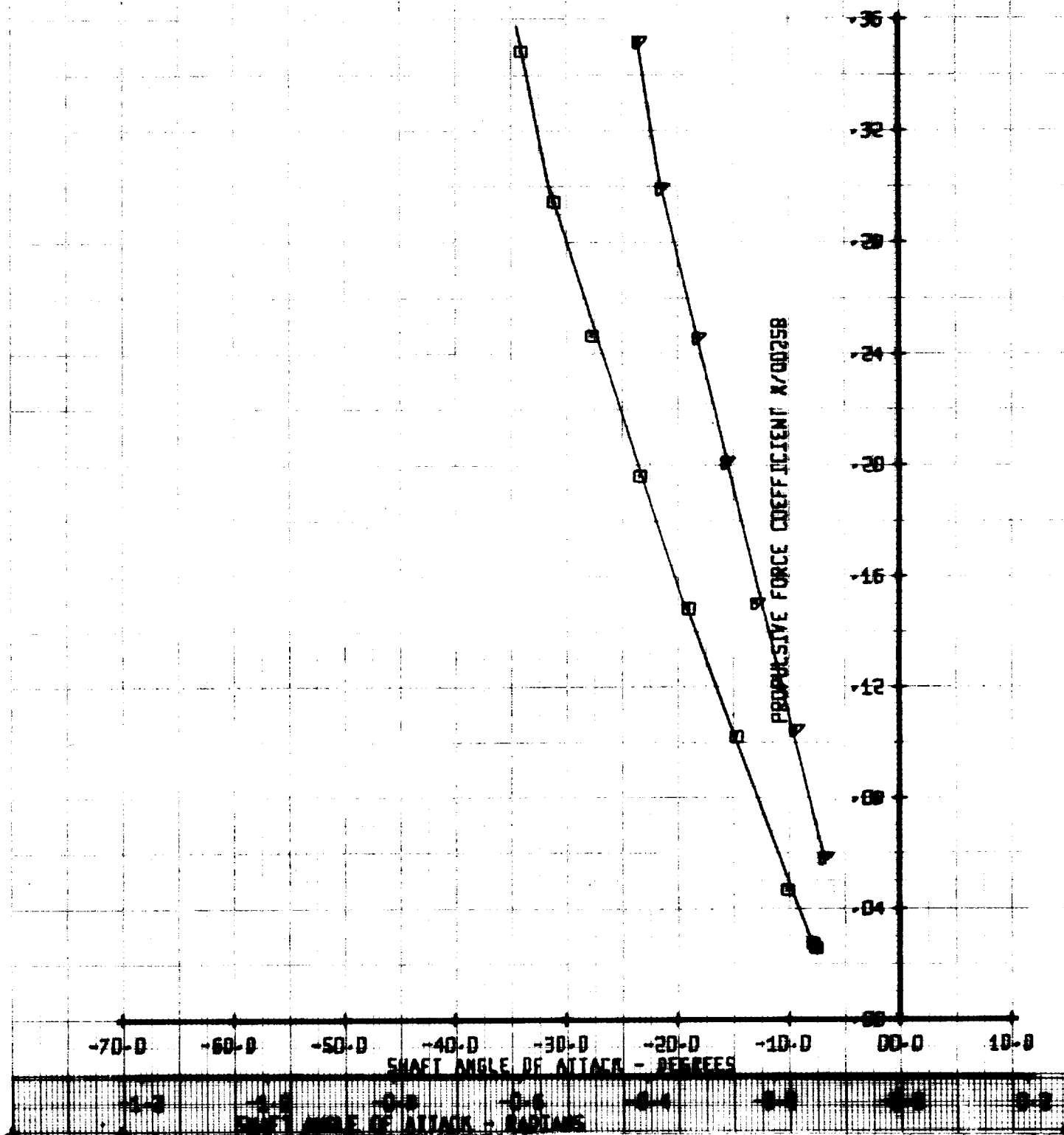


Figure B-3

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / 58	VTUN
□	230	.40	.06	248
△	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
COLLECTIVE PITCH

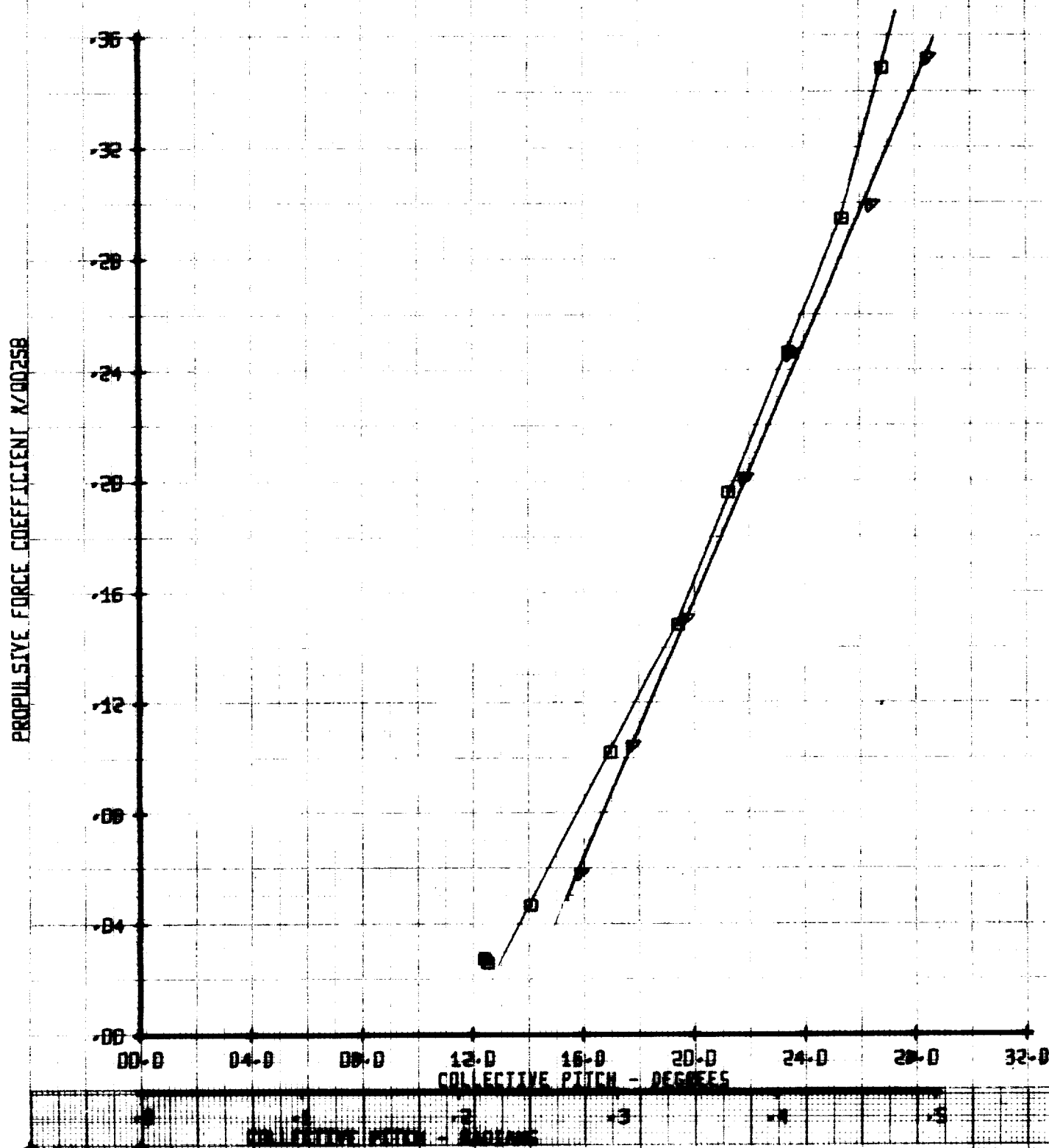


Figure B-4

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

SYM		LEGEND		CT/58		VTUN	
□	230	MJ'	.40		240		
▽	231		.40		240		

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LONGITUDINAL CYCLIC

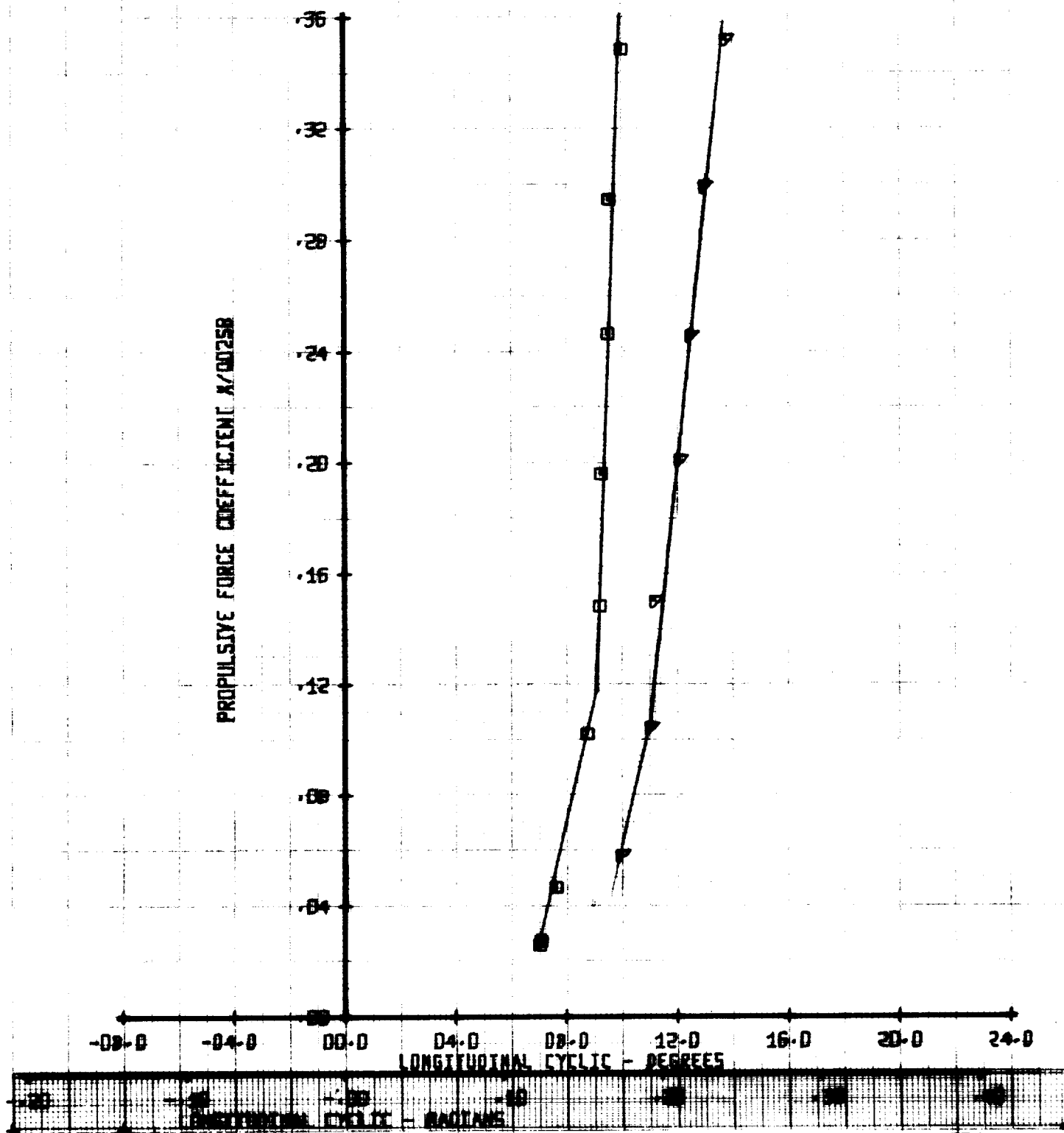


Figure B-5

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU	CT/VS	VTUN
□	230	.40	.06	240
△	231	.40	.09	240

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LATERAL CYCLIC

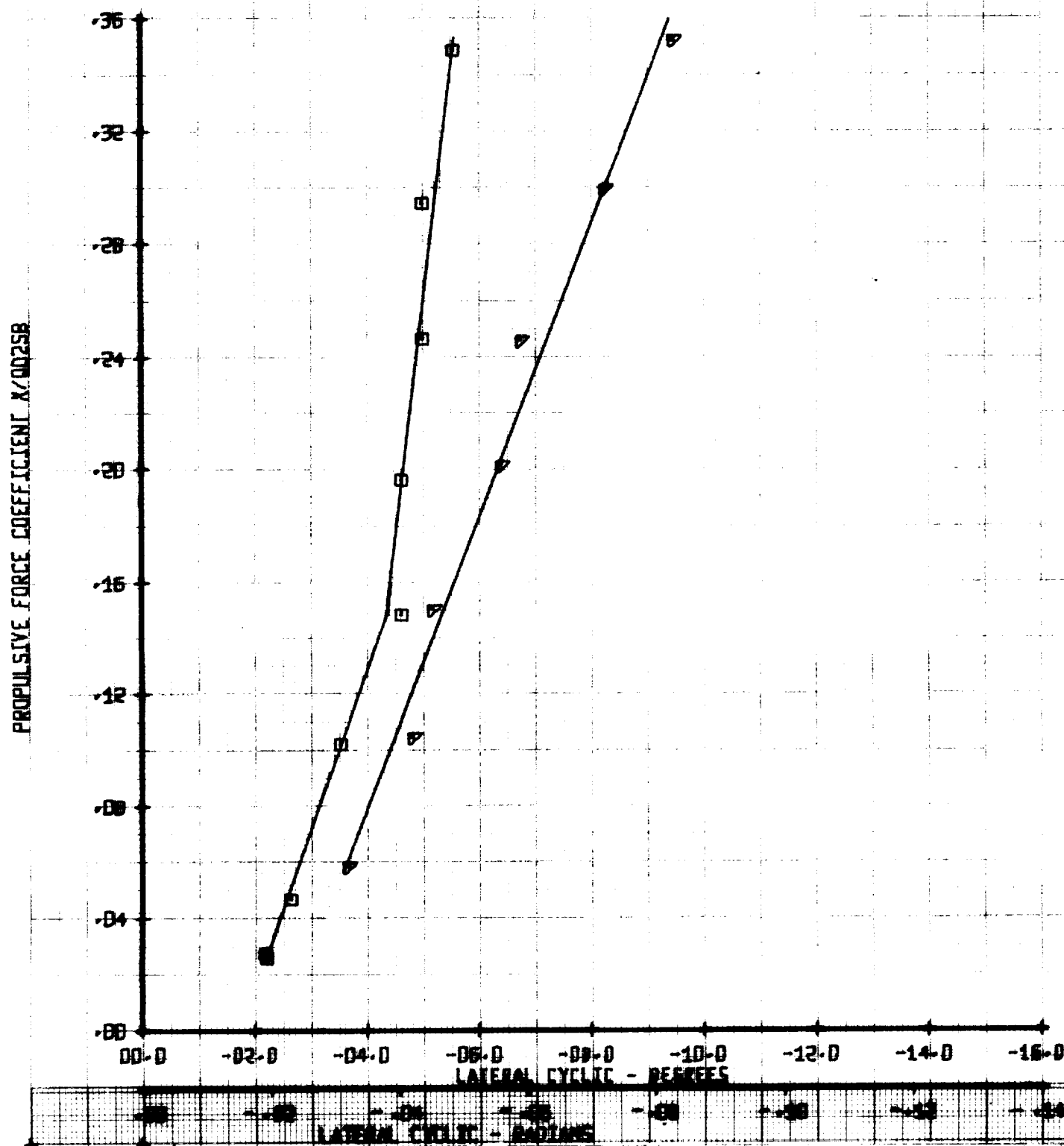


Figure B-6

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND		CT/58	VTUN
SYM	RUN	MU'	
□	230	.40	248
▽	231	.40	248

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR POWER COEFFICIENT

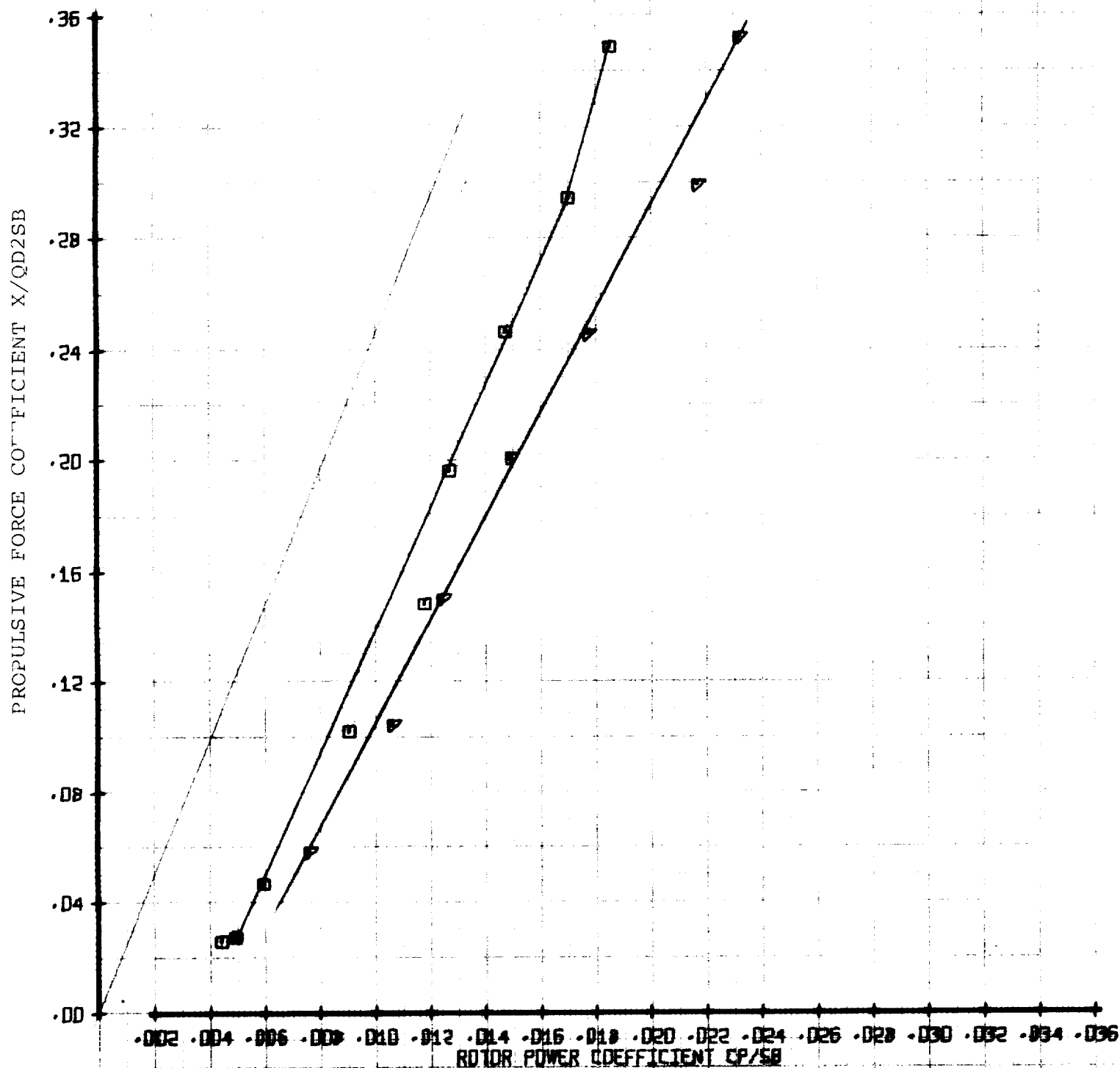


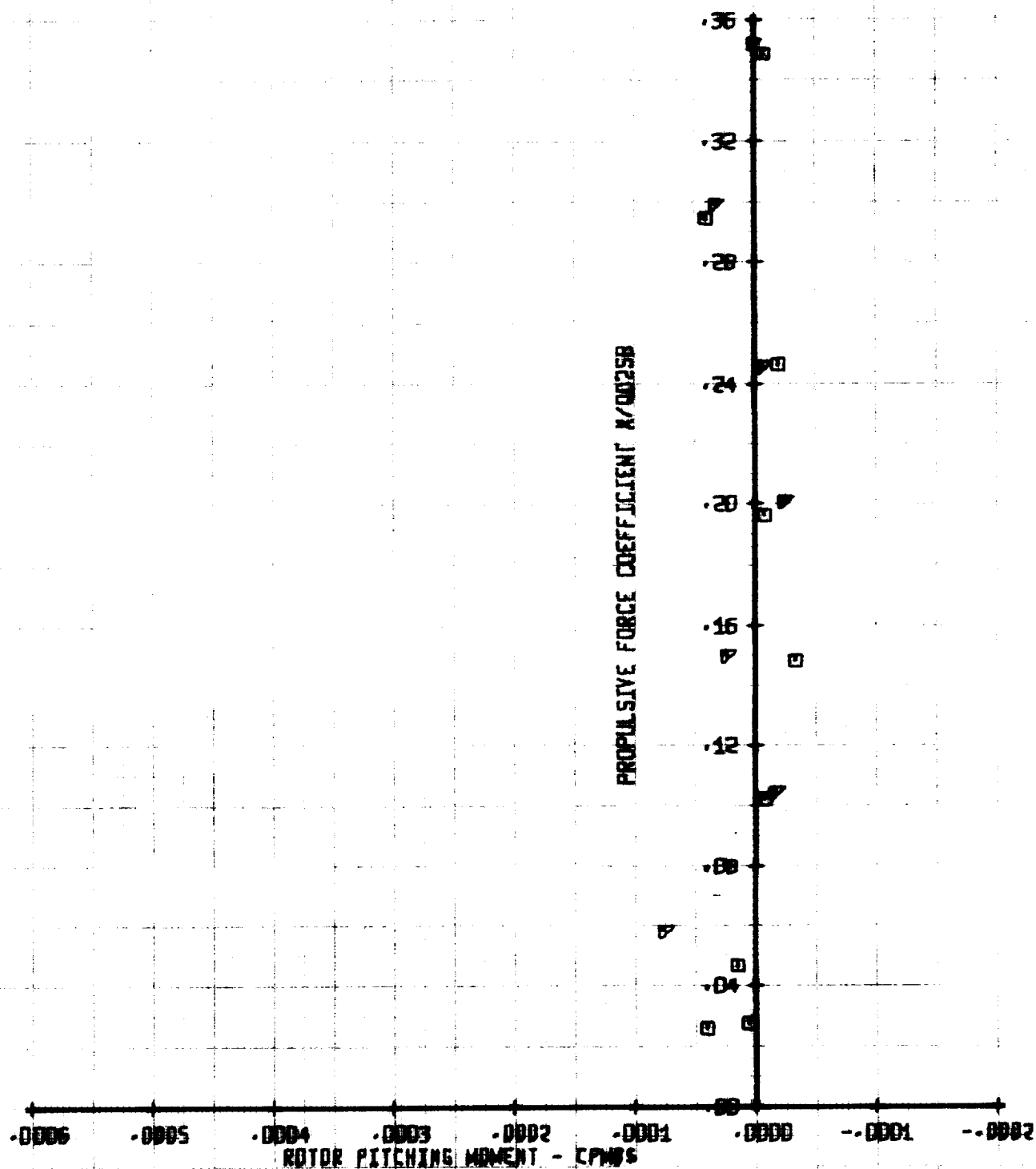
Figure B-7

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU	CT/58	VTUN
□	230	.40	.06	248
▽	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PITCHING MOMENT



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MU'	CT'2SB	VTUN
□	230	.40	.06	24B
△	231	.40	.09	24B

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR ROLLING MOMENT COEFFICIENT

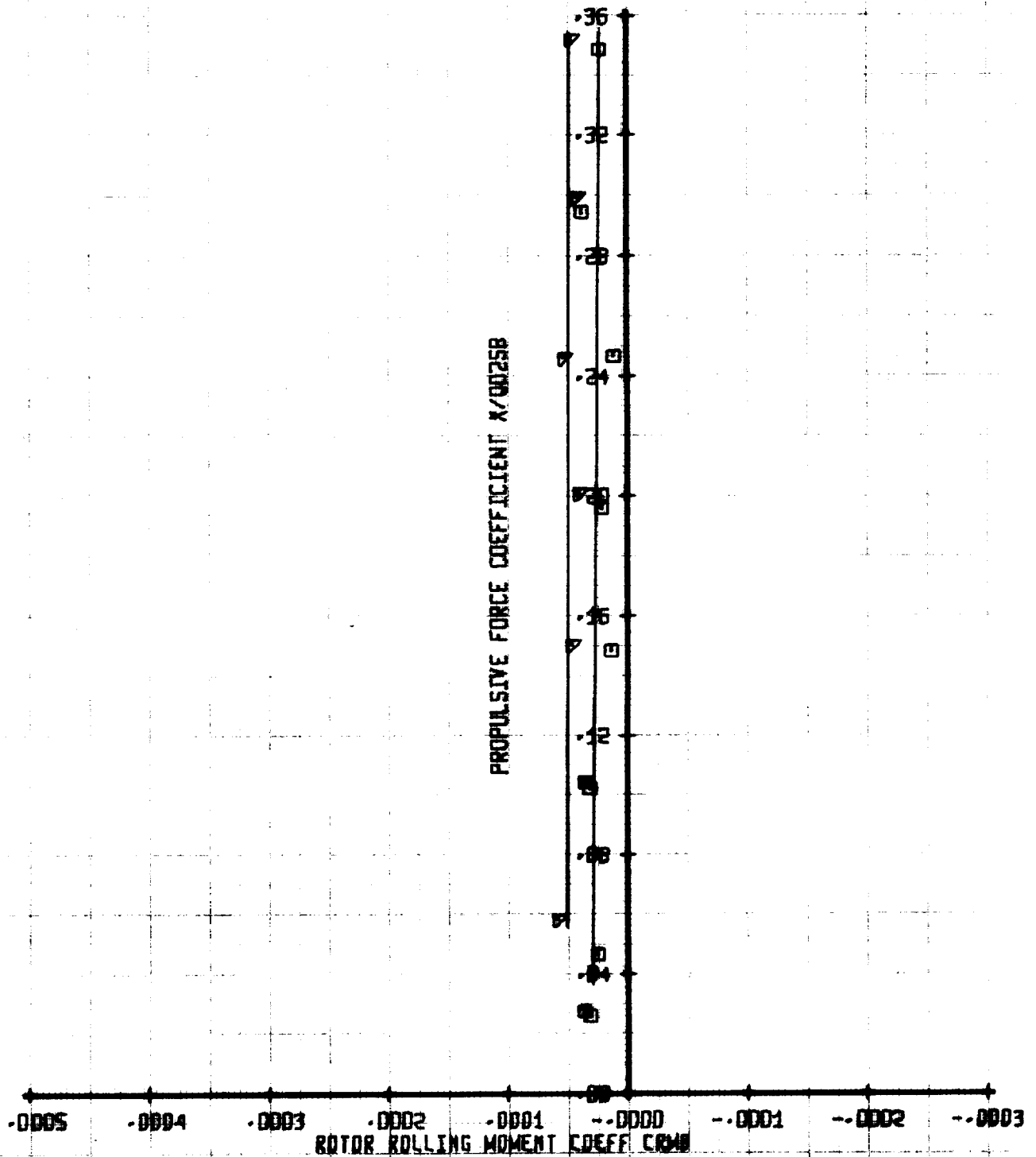


Figure B-9

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND		CT/58	VTUN
SYM	RUN	MU	
□	230	.40	248
△	231	.40	248

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR LONGITUDINAL FORCE COEFFICIENT

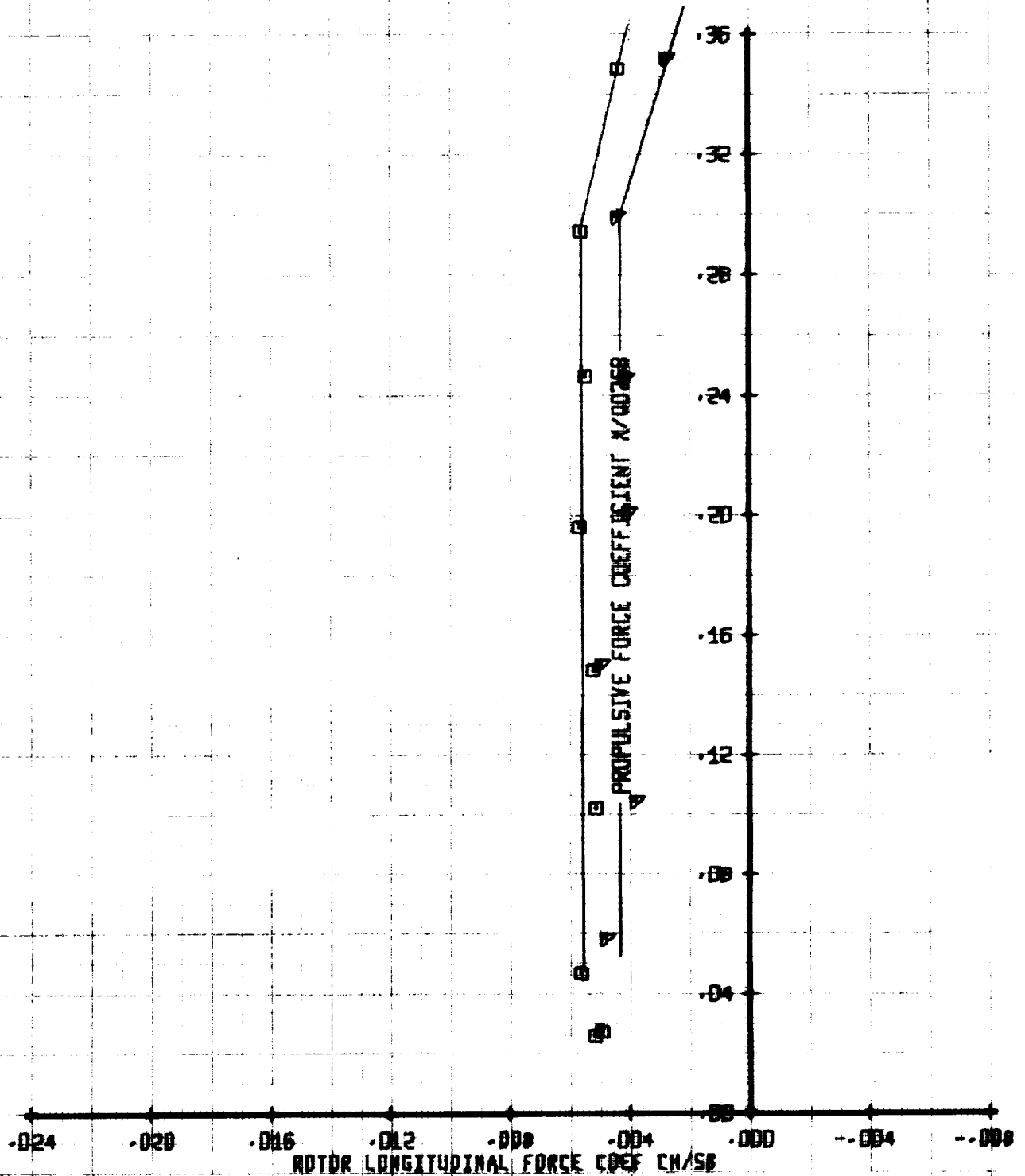


Figure B-10

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU	CT/58	VTUM
□	230	.40	.06	248
△	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR SIDE FORCE COEFFICIENT

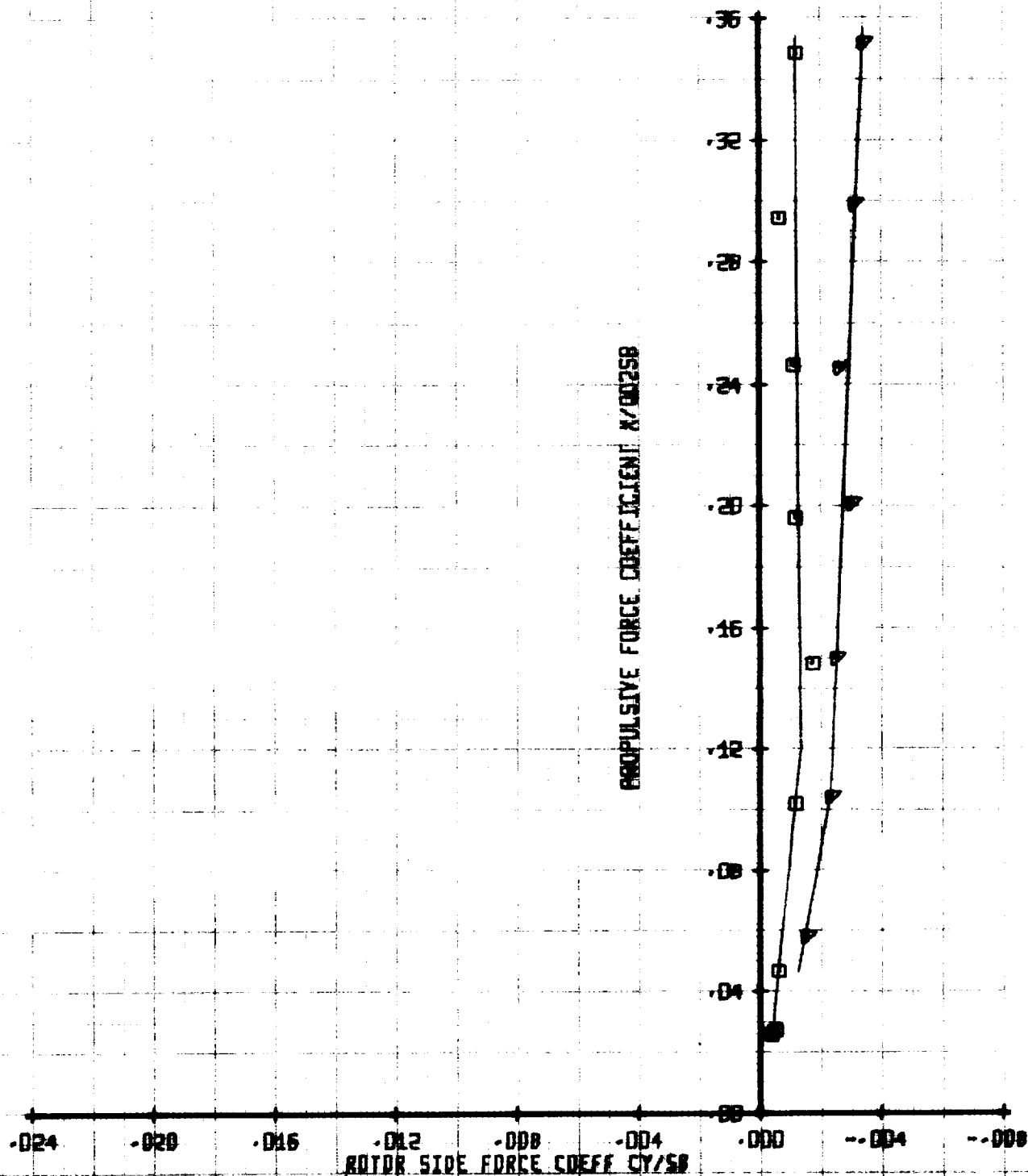


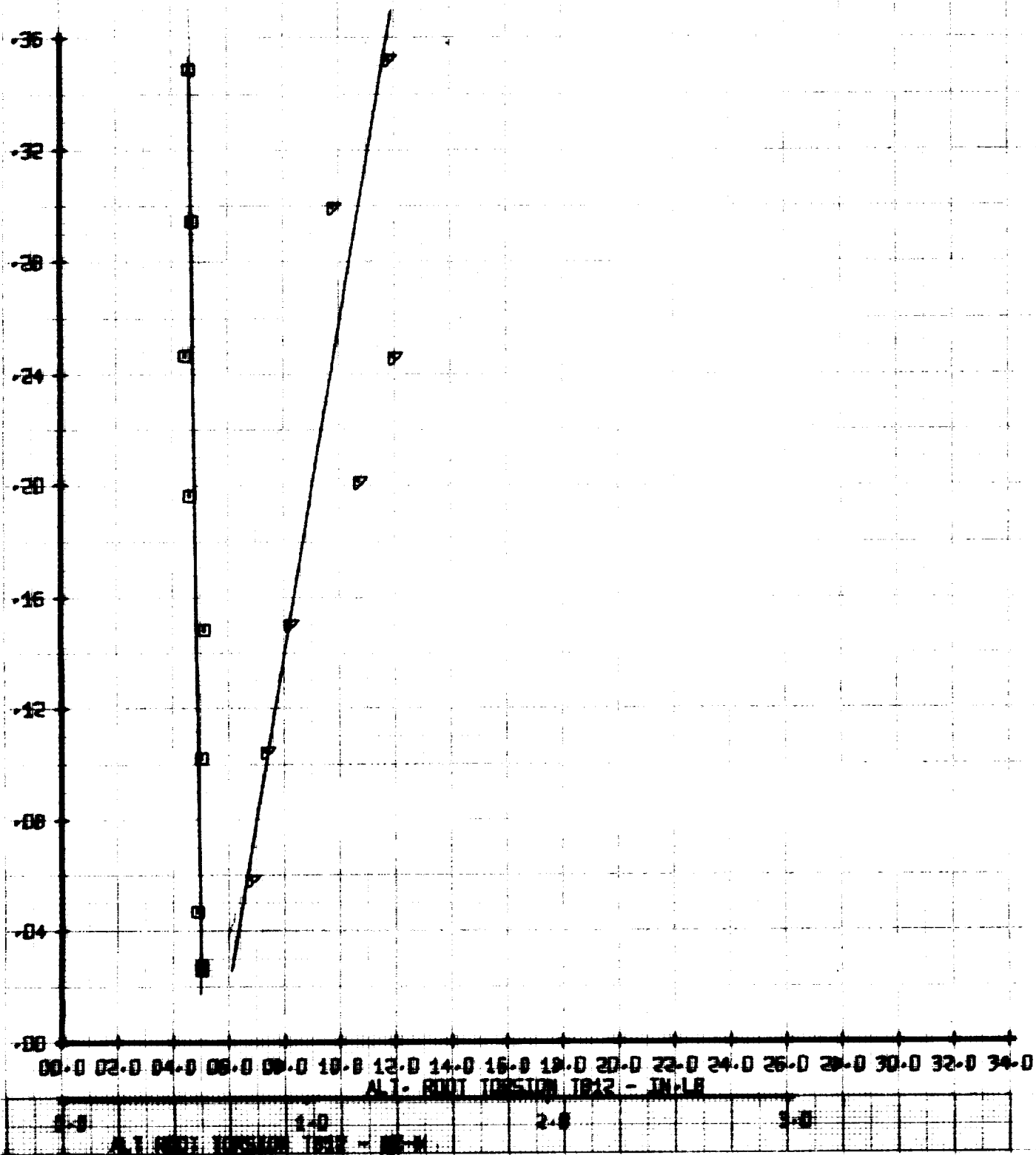
Figure B-11

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MI'	CT'/58	YTLN
□	230	.40	.06	248
△	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

PROPULSIVE FORCE COEFFIC T X/00258



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	MIN	MI'	CT'Y58	YTLN
□	230	.40	.06	240
▽	231	.40	.09	240

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50

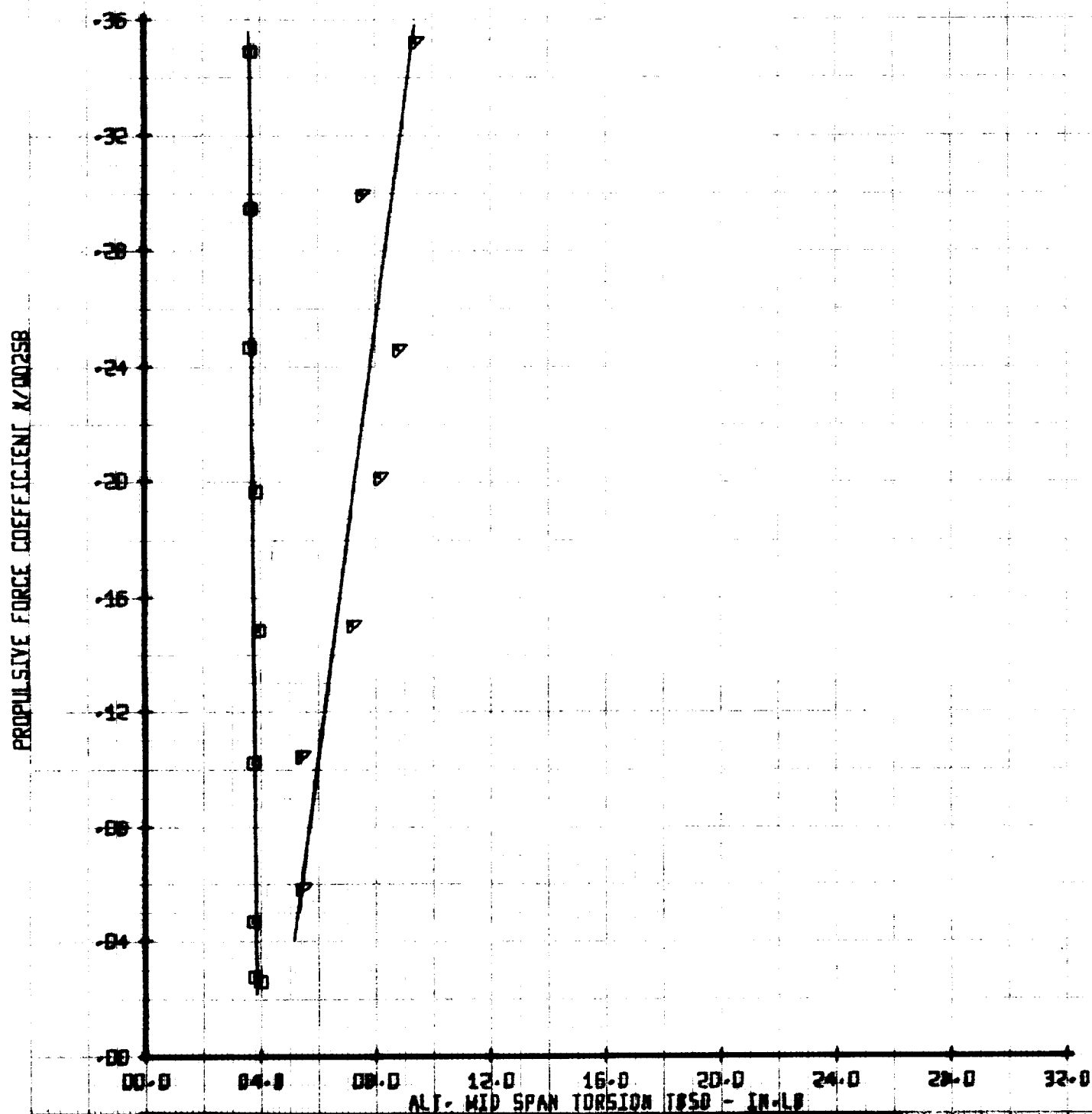


Figure B-13

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'58	YTLN
○	230	.40	.06	248
▽	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING OUTBOARD TORSION TB80

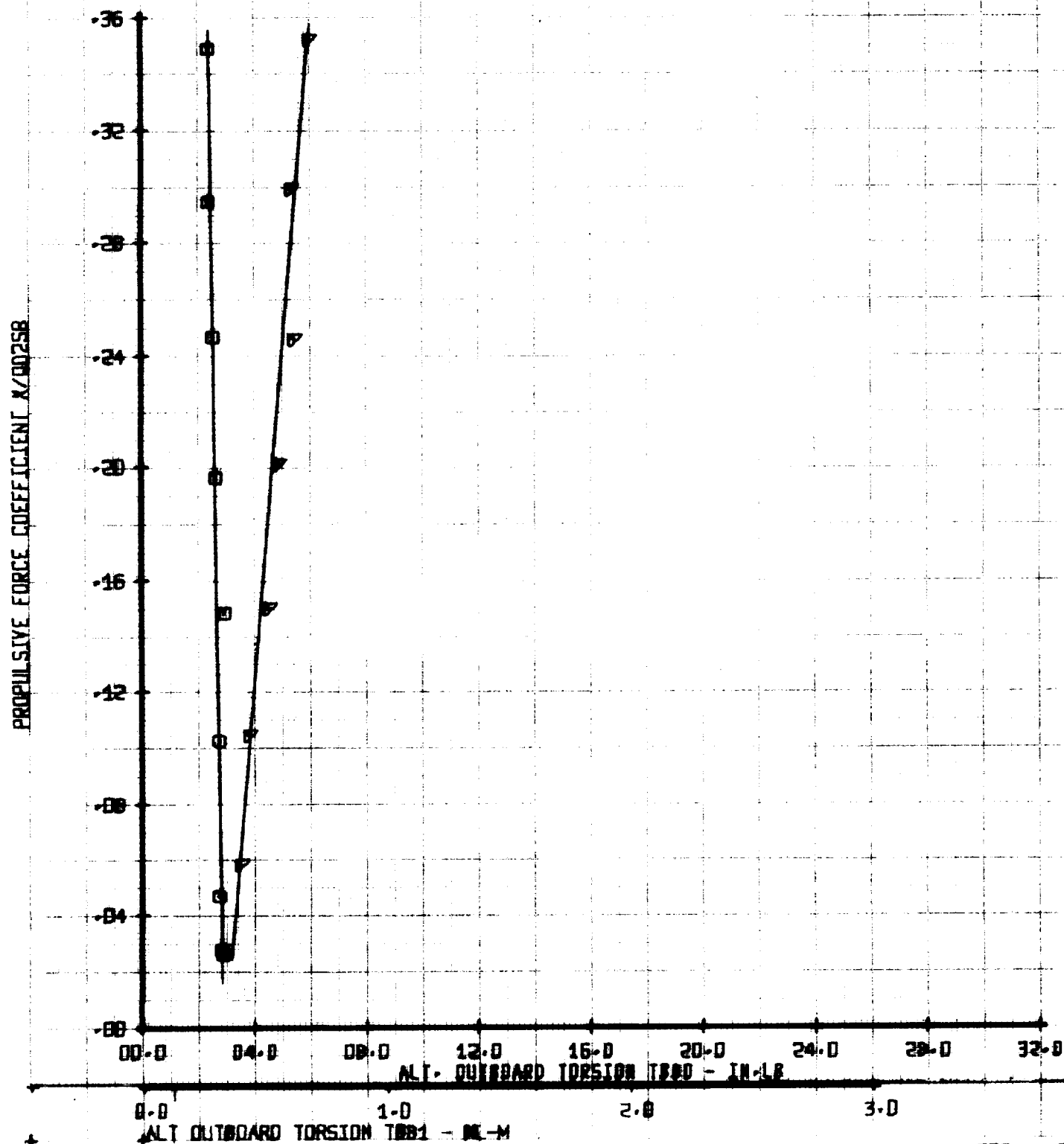
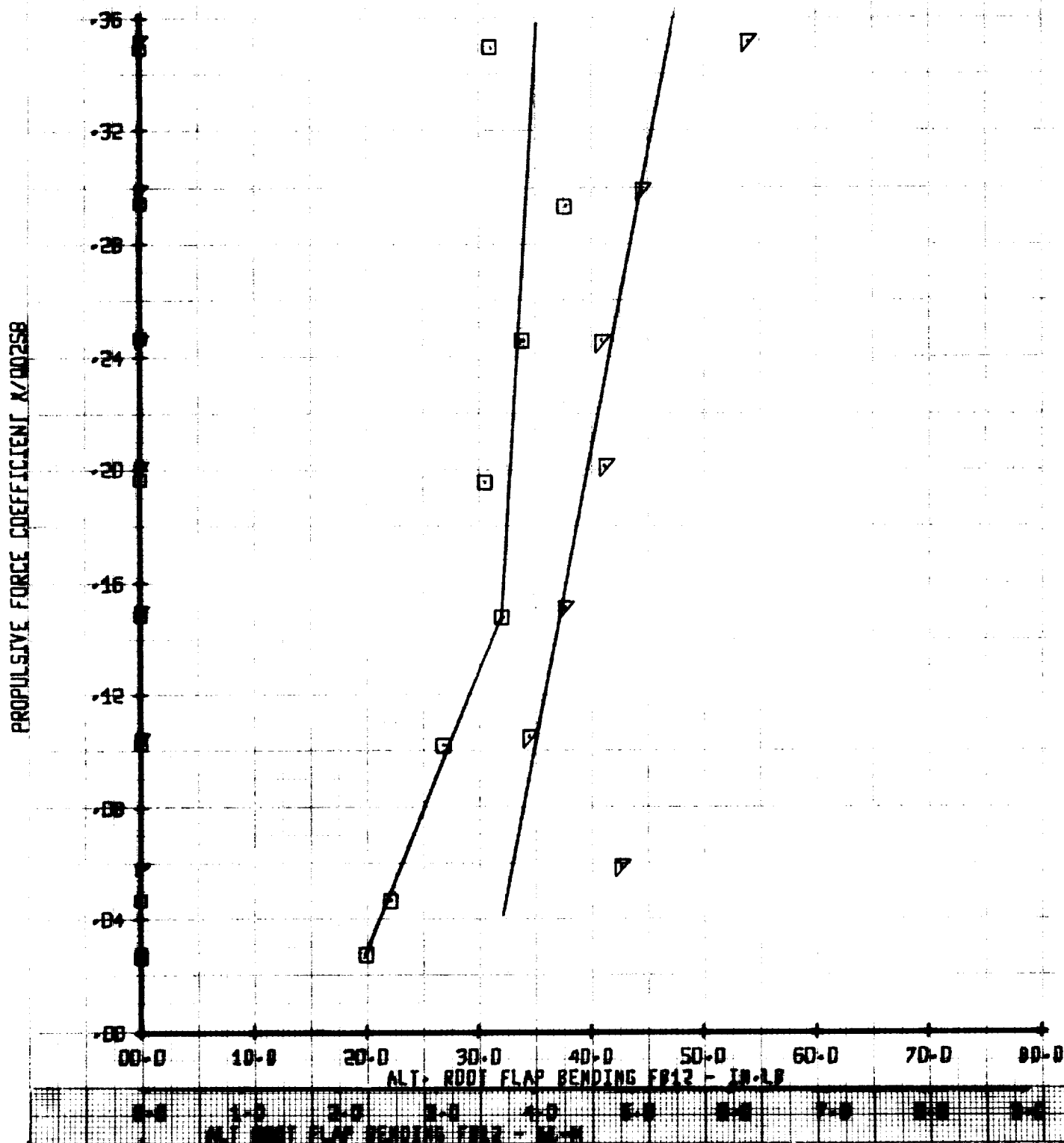


Figure B-14

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM		LEGEND		VTUN	
□	230	MI'	CT' / SB	248	
▽	231	.40	.06	248	
		.40	.09		

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

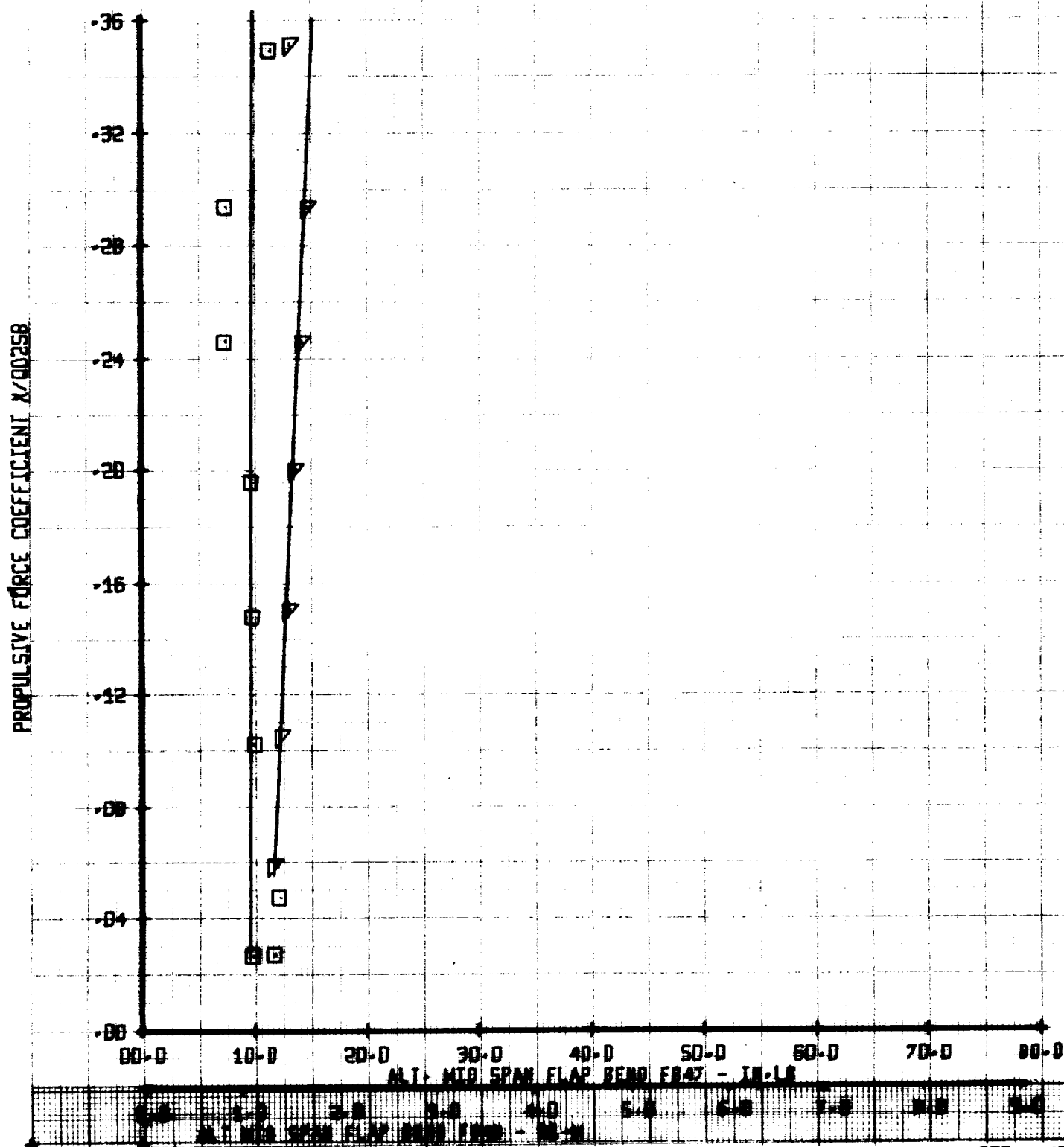


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	YTLN
□	230	.40	.06	248
▽	231	.40	.09	248

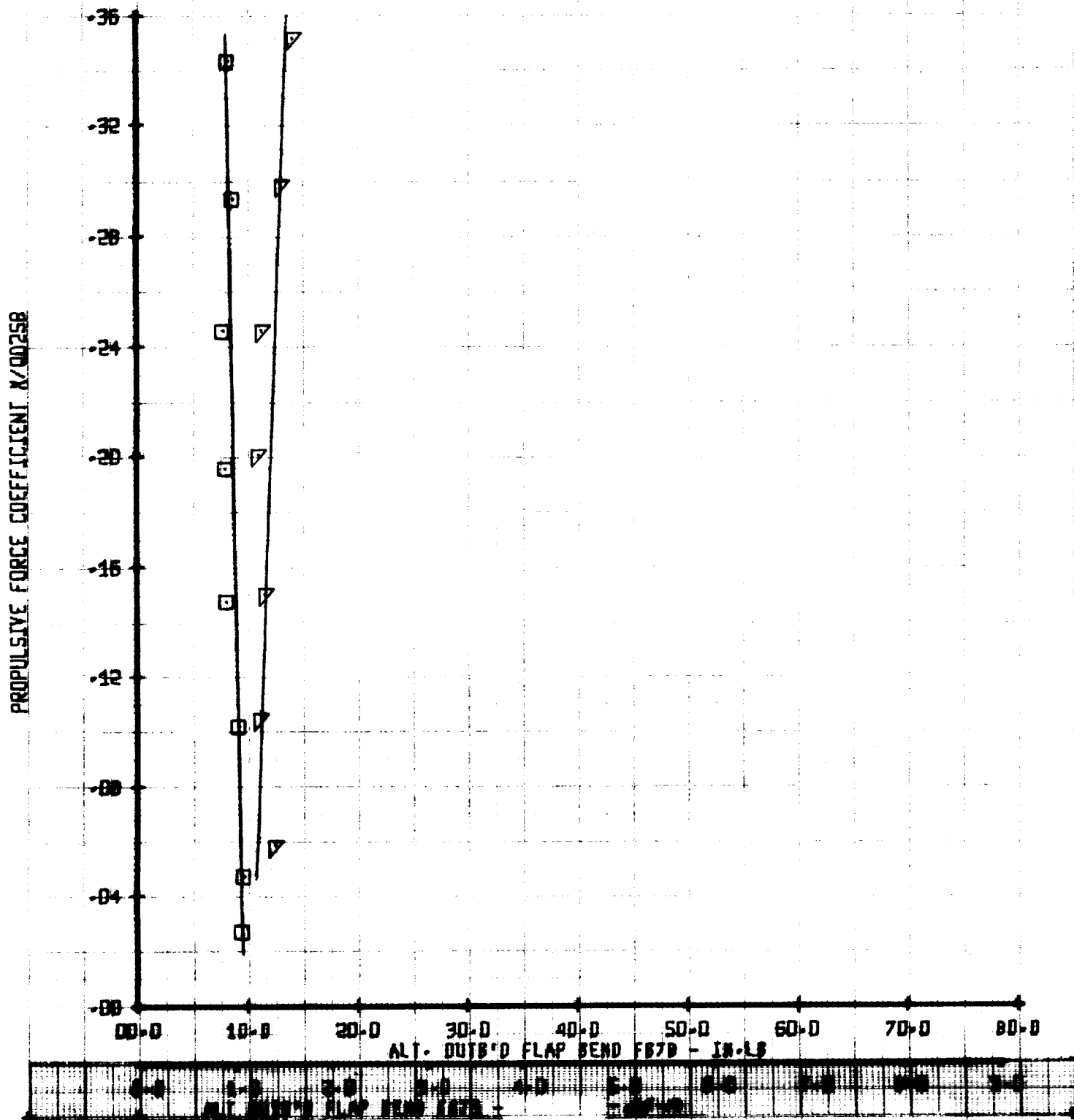
PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING MID SPAN FLAP BENDING FB47



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47D ROTOR
 PROPULSIVE FORCE LIMIT TESTING

SYM		RUN		LEGEND		CT'/SB		VTUN	
□	230	.40	.06	248					
▽	231	.40	.09	248					

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING OUTBOARD FLAP BENDING FB78



SET 47
 BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT' / 58	VTUM
□	230	.40	.06	248
▽	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

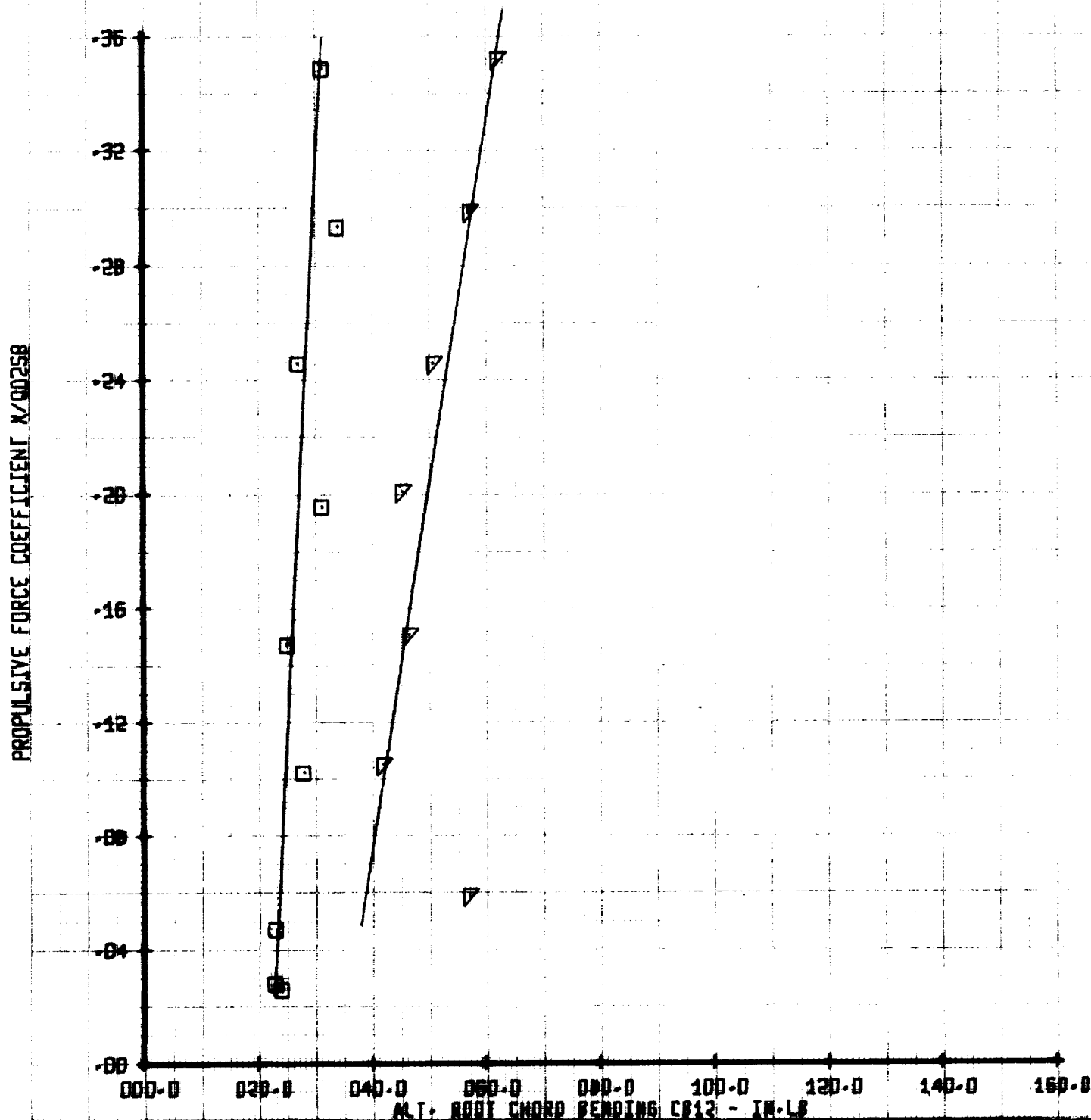


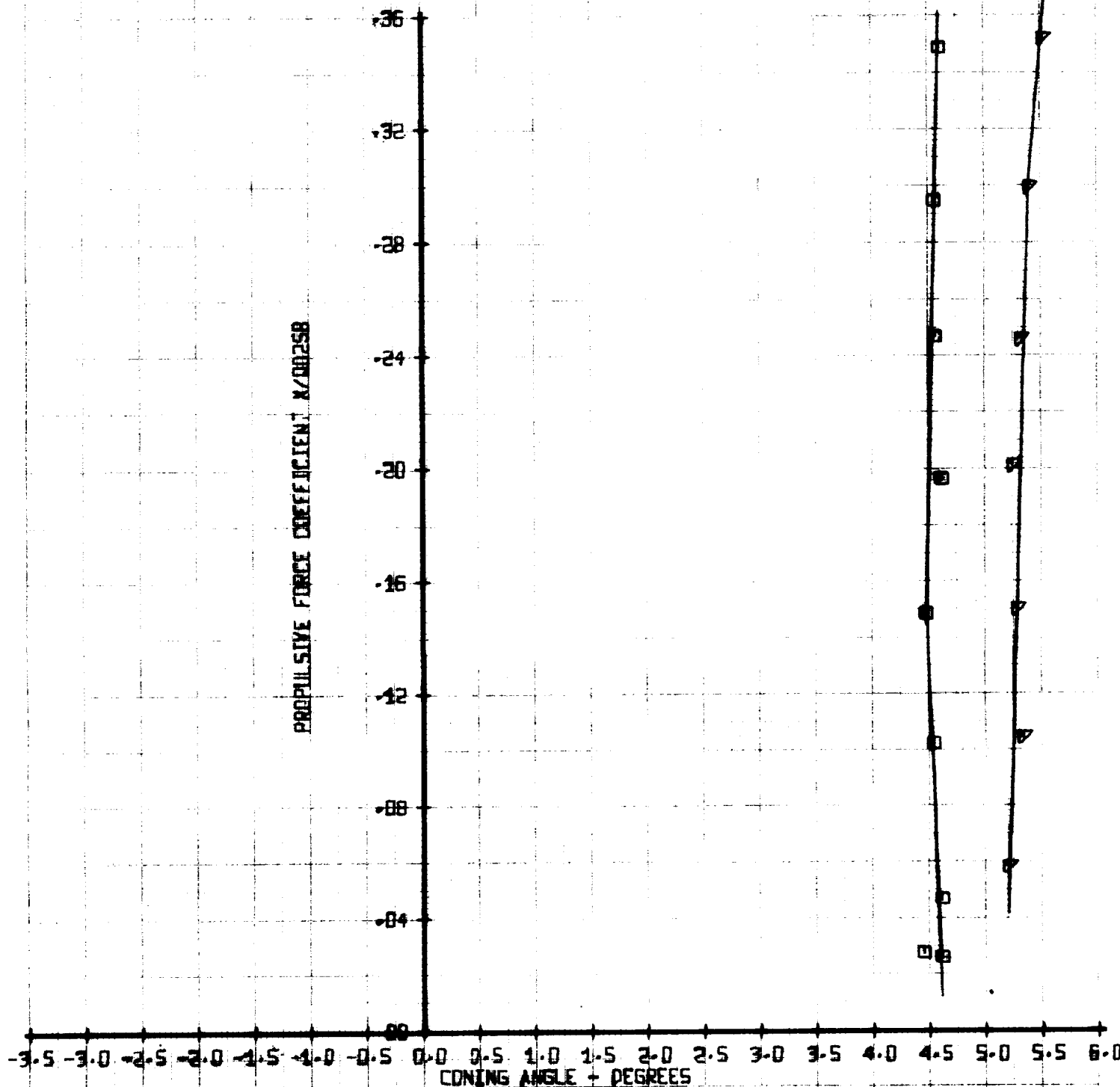
Figure B-18

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	BLN	MU'	CT'/2SB	YBLN
□	230	.40	.06	248
△	231	.40	.09	248

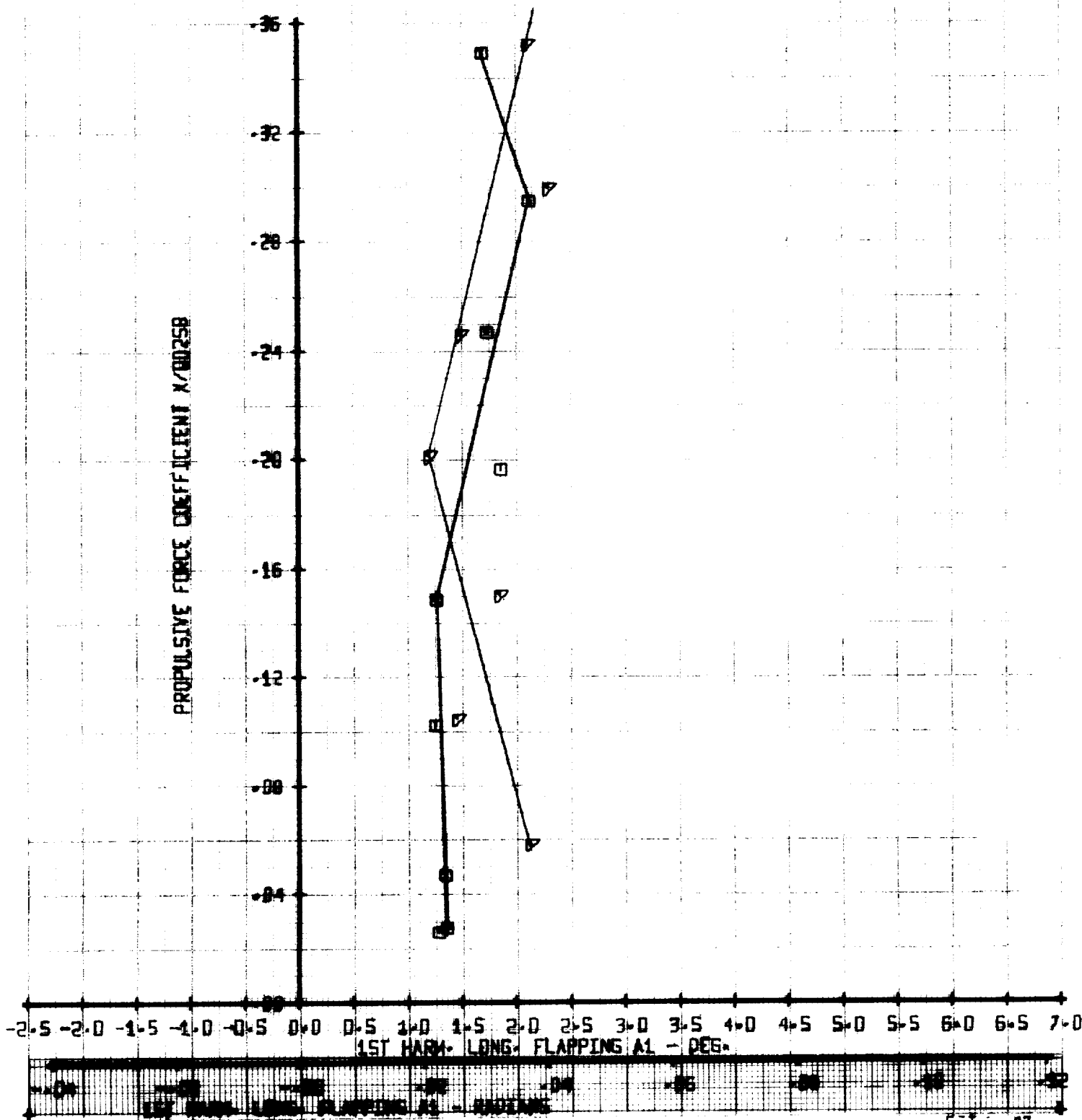
PROPULSIVE FORCE COEFFICIENT
VERSUS
CONING ANGLE



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MU'	CT' / 58	YIUM
□	230	.40	.06	248
▽	231	.40	.09	248

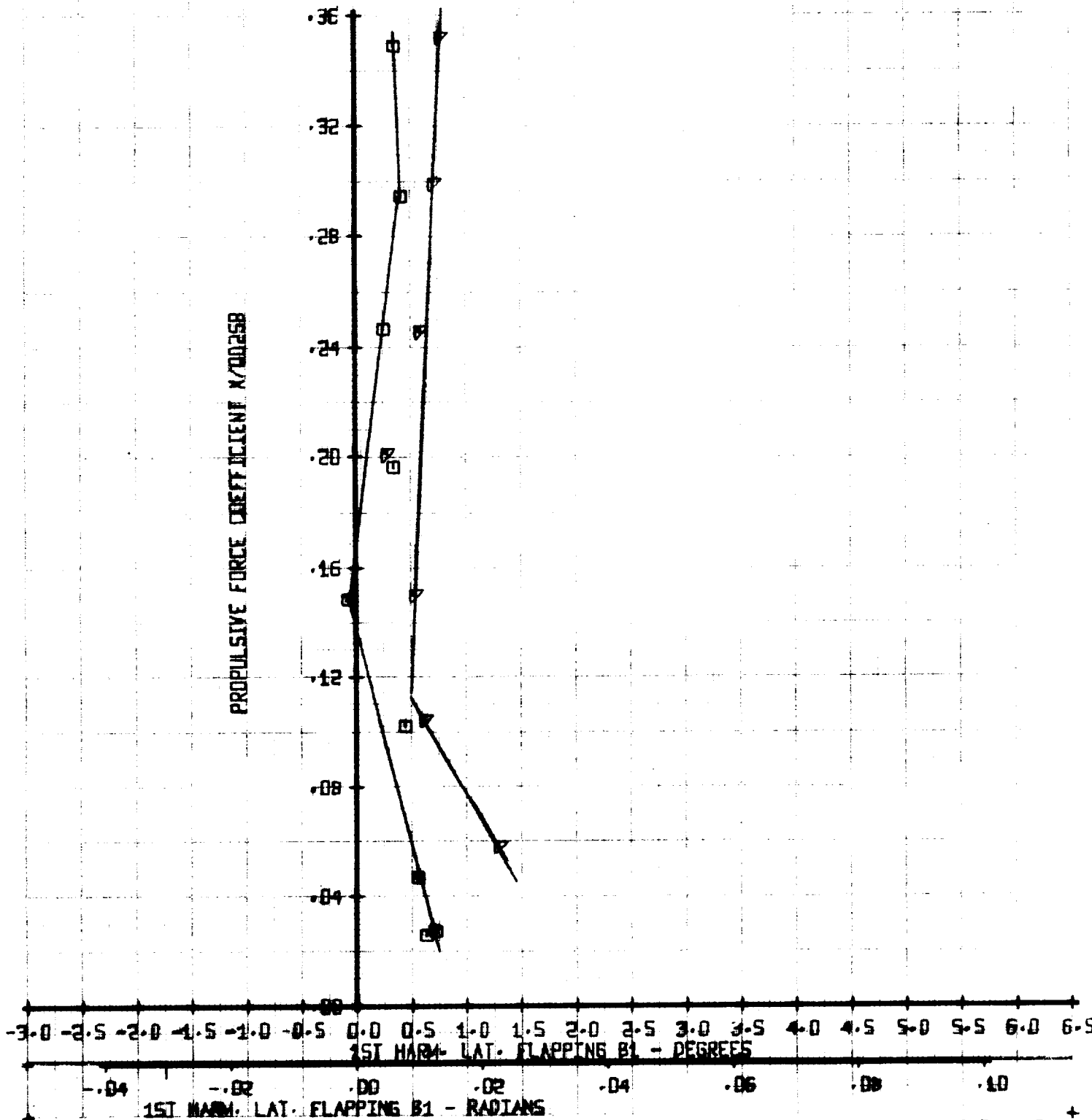
PROPULSIVE FORCE COEFFICIENT
 VERSUS
 1ST HARMONIC LONGITUDINAL FLAPPING A1



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND				
SYM	RUN	MU'	CT'/SB	YTDW
□	230	.40	.06	248
▽	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

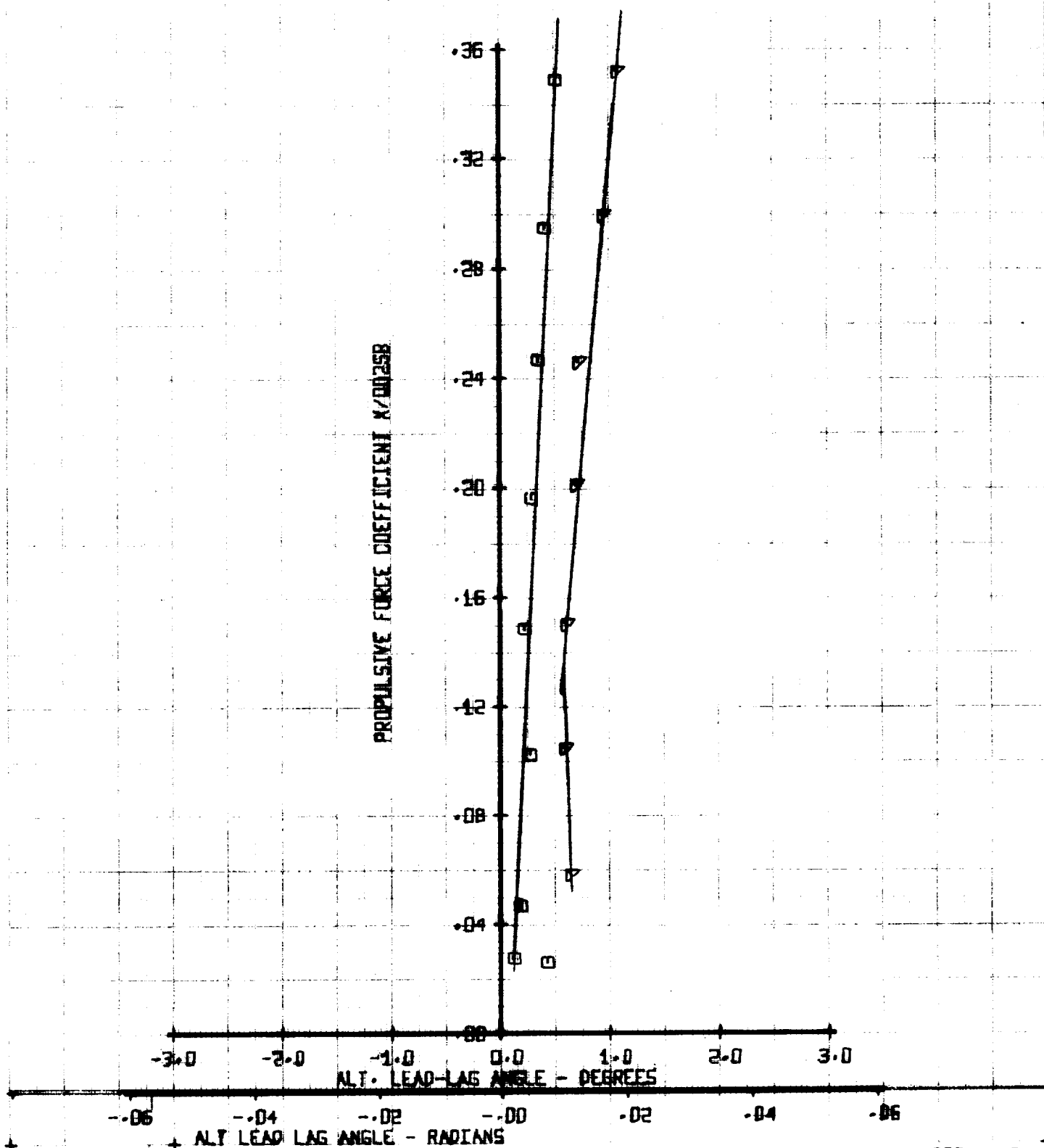


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	MIN	MLI	CT°/58	YTLN
□	230	.40	.06	248
△	231	.40	.09	248

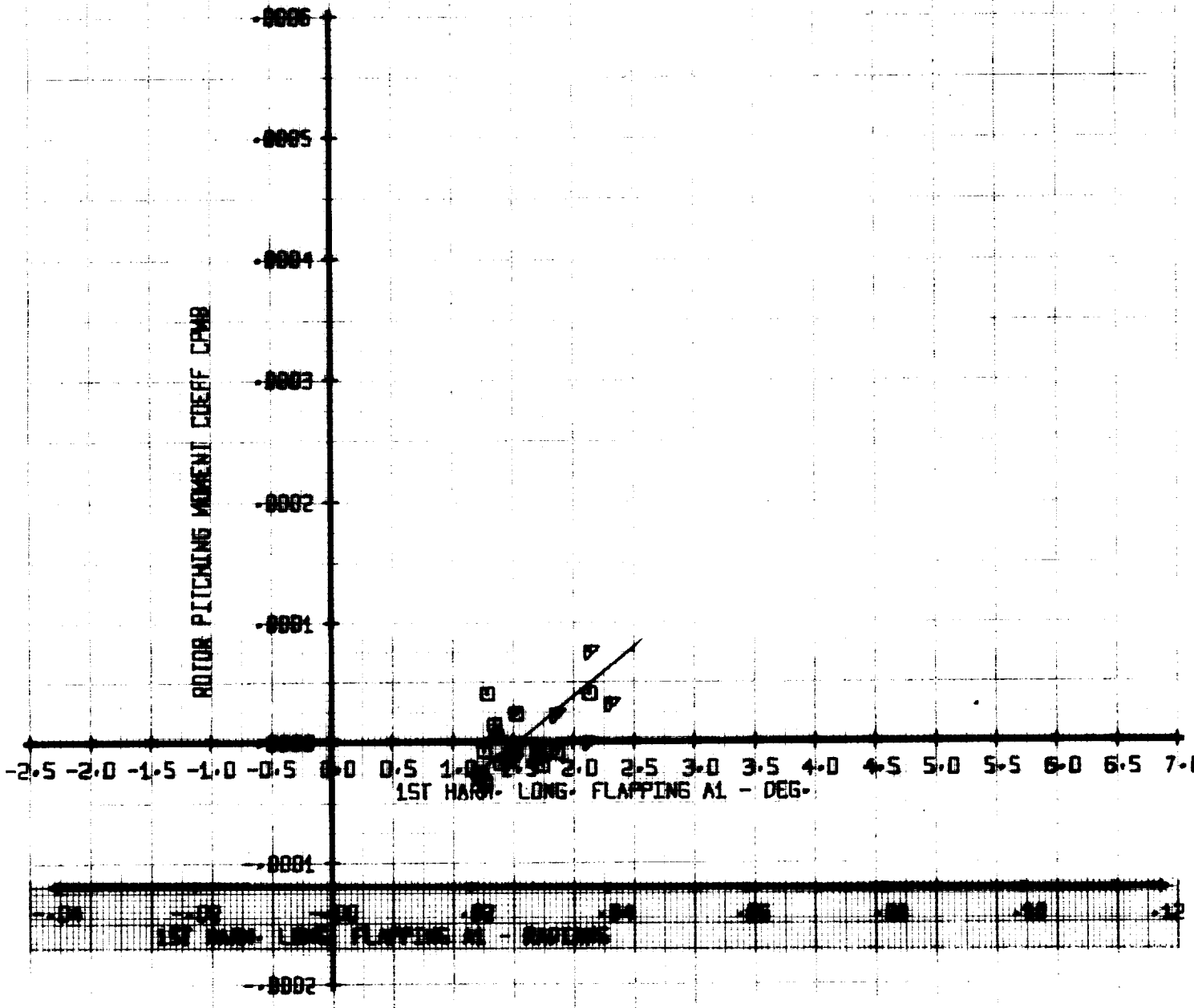
PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

		LEGEND			
SYM	RUN	MU'	CT'/SB	YTLN	
□	230	.40	.06	248	
▽	231	.40	.09	248	

ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1

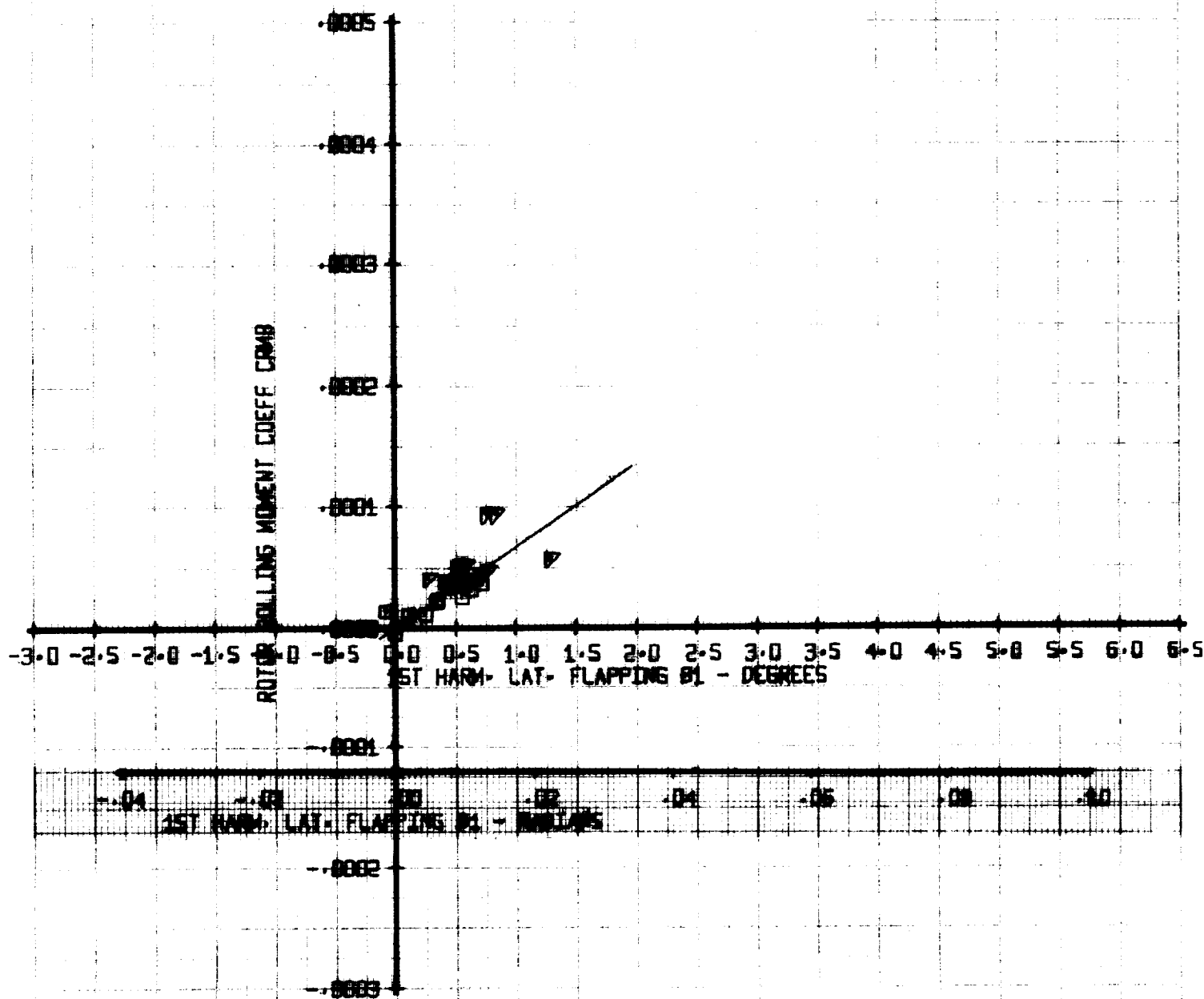


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	BLIN	MLI'	CT' / 58	YTUN
0	230	.40	.06	248
7	231	.40	.09	248

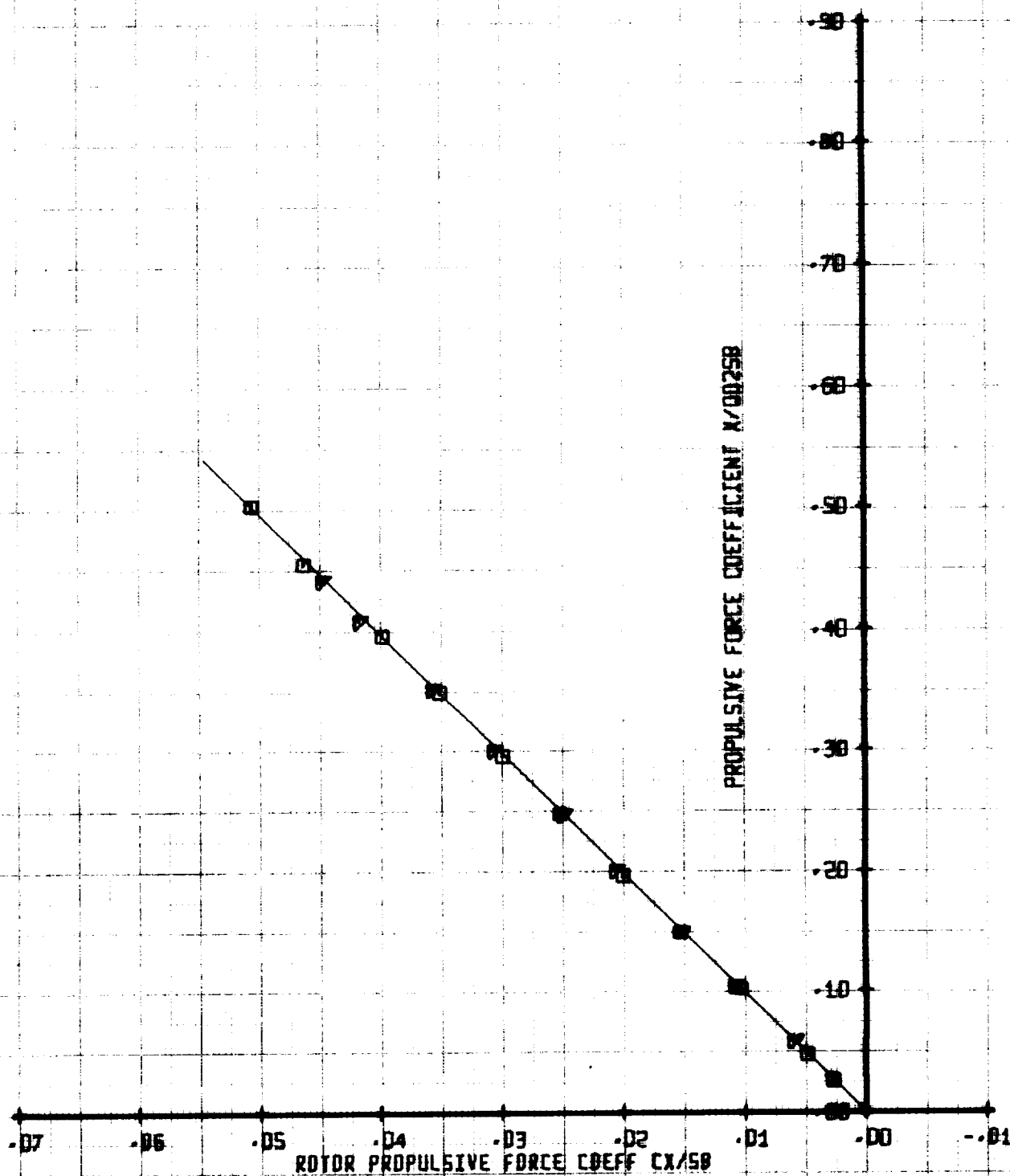
ROTOR ROLLING MOMENT COEFFICIENT
 VERSUS
 1ST HARMONIC LATERAL FLAPPING B1



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MU'	CT'/SB	VTUN
Q	230	.40	.06	248
P	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR PROPULSIVE FORCE COEFFICIENT

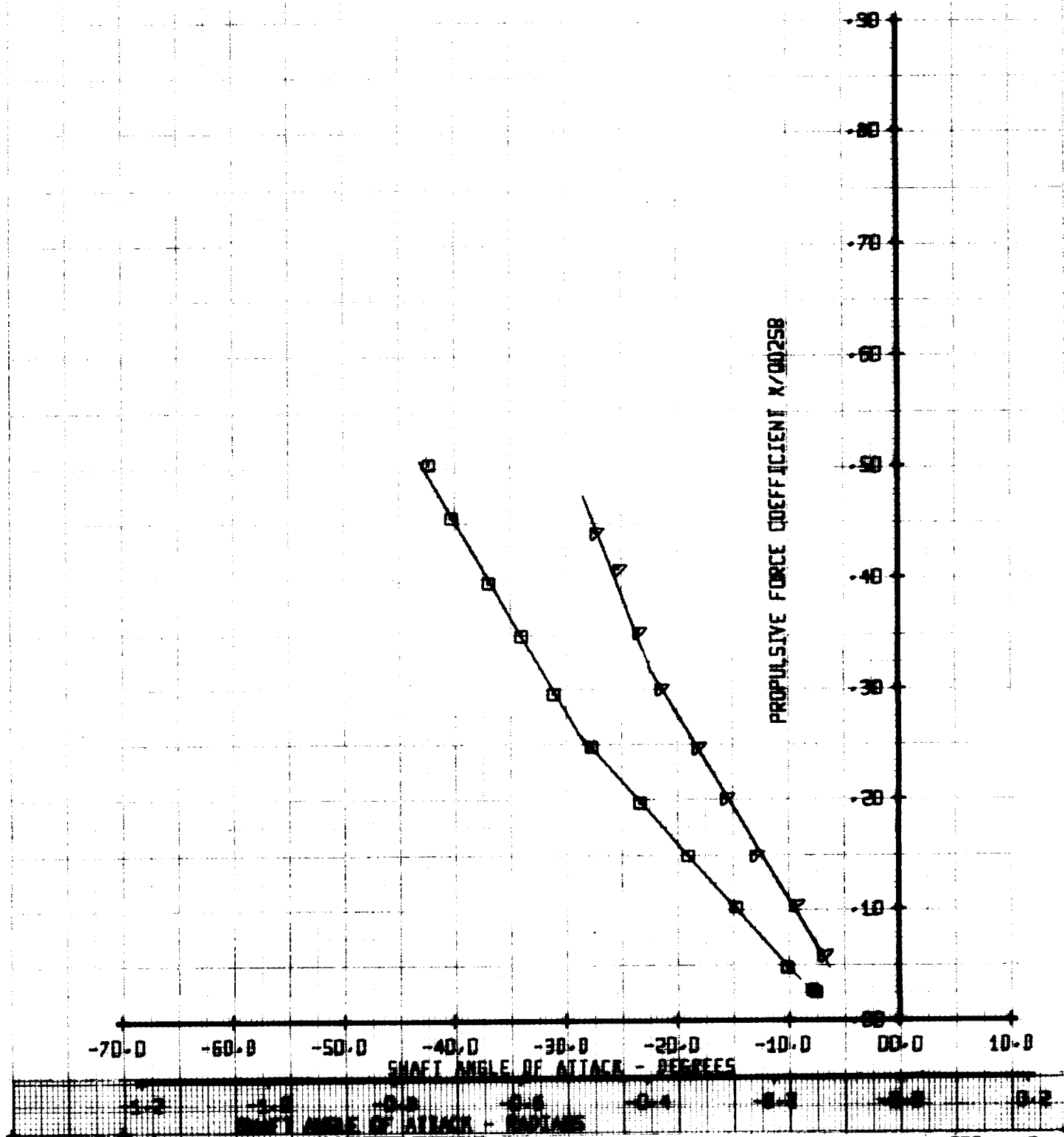


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CN-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VTUN
□	230	.40	.06	248
△	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND				
SYM	RUN	MU'	CT'258	VTUN
□	230	.40	.06	248
●	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
COLLECTIVE PITCH

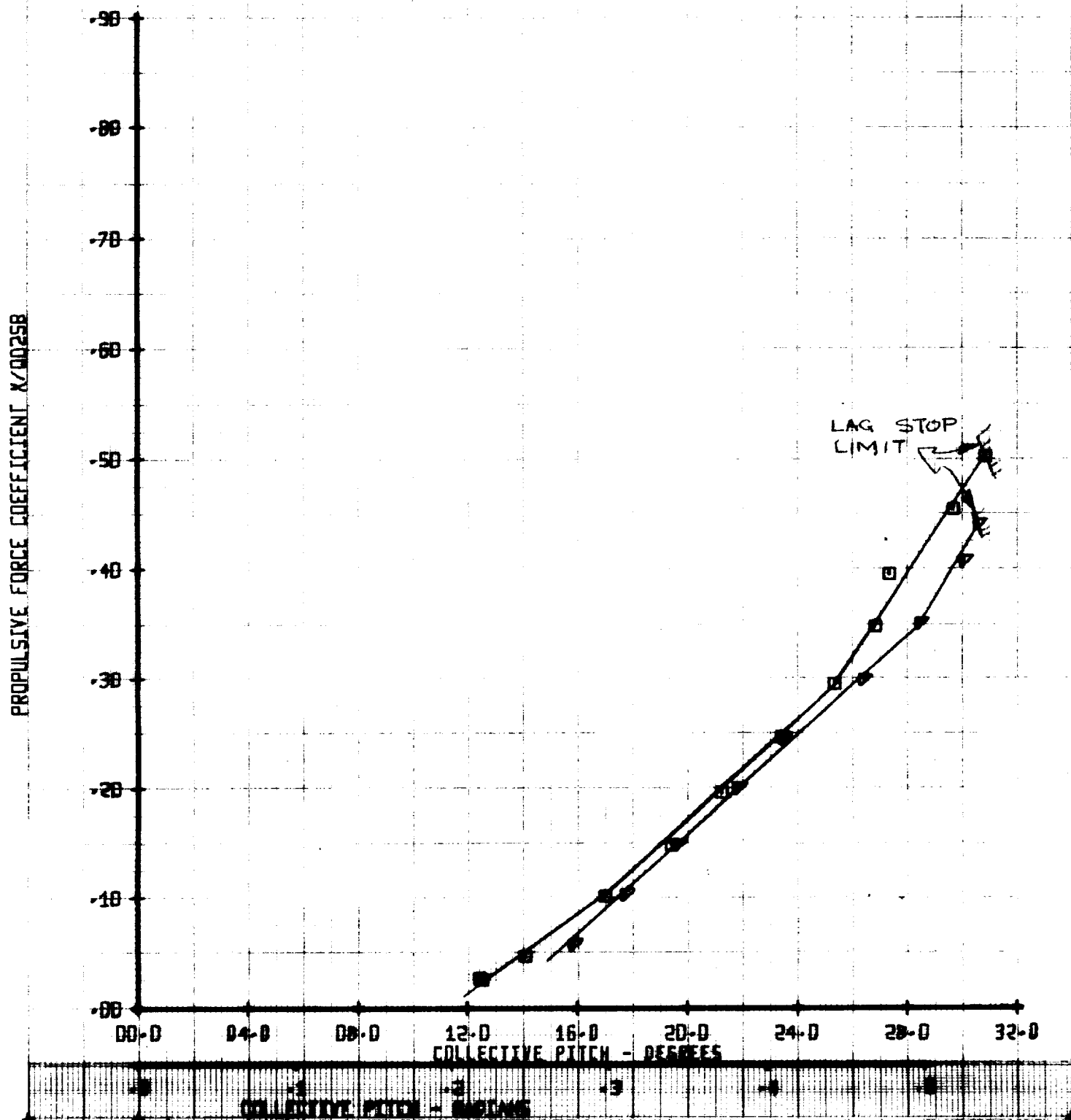


Figure B-27

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI	CT'/SB	VTUN
□	230	.40	.06	24B
▽	231	.40	.09	24B

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LONGITUDINAL CYCLIC

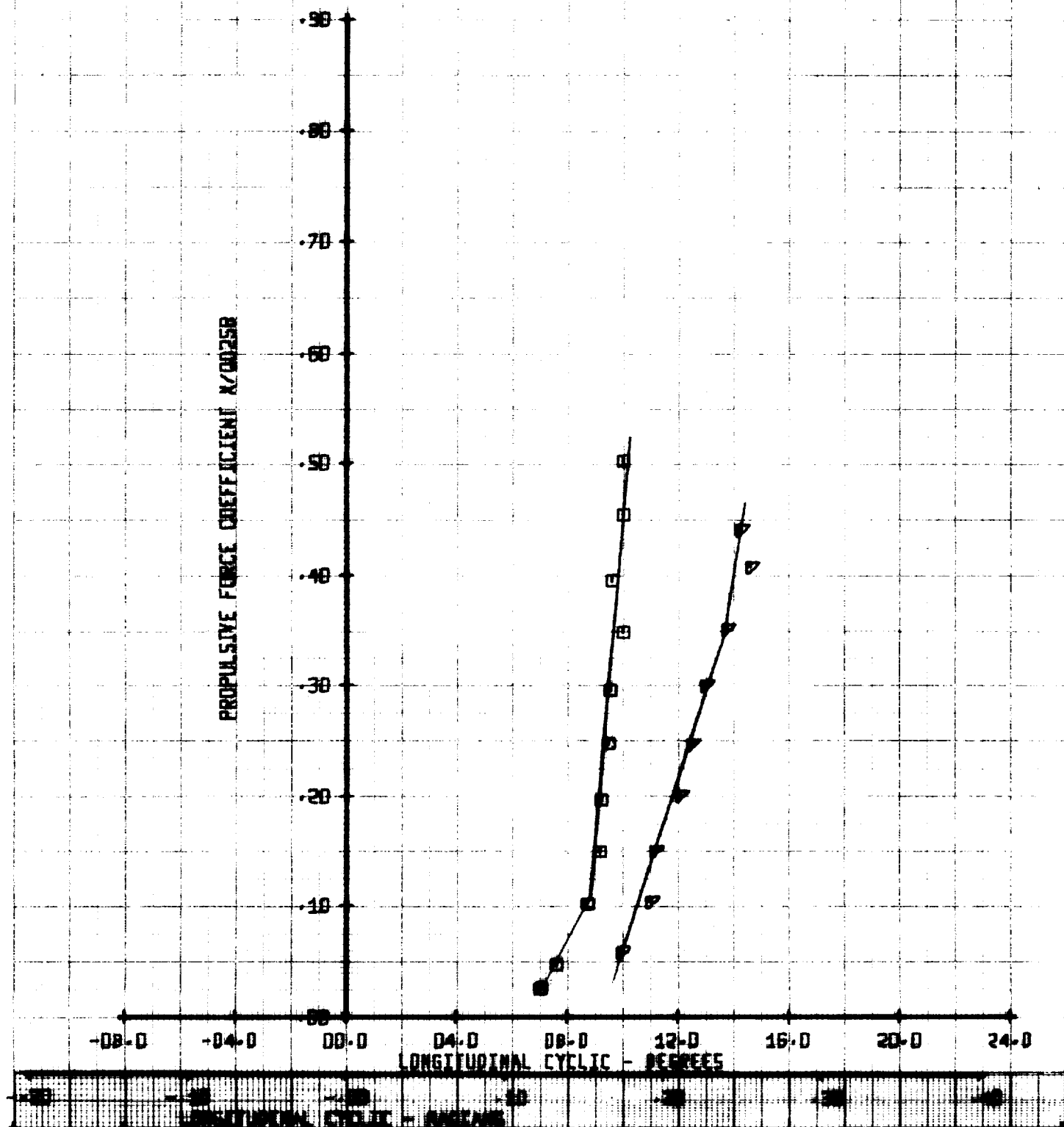


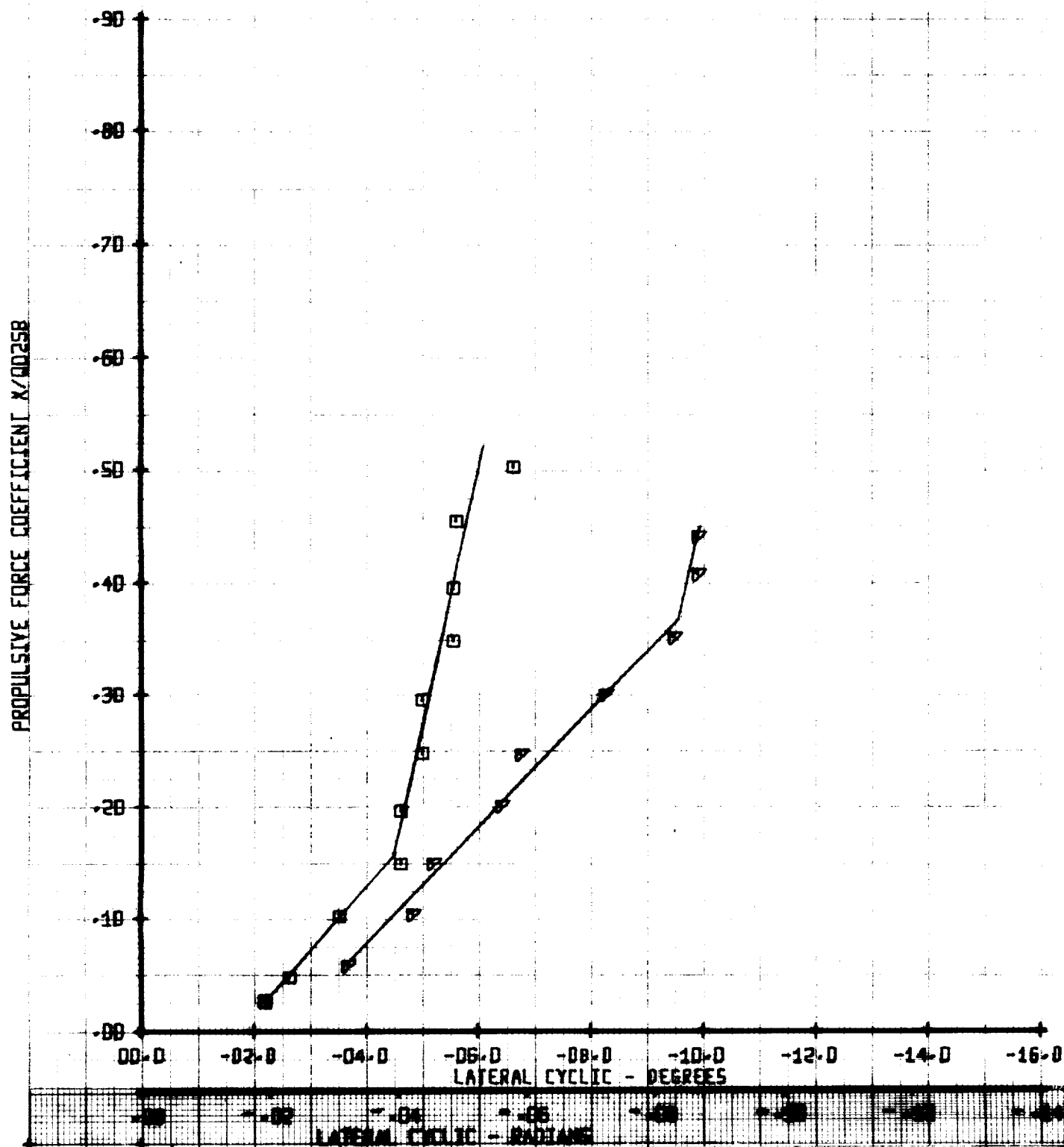
Figure B-28

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT' / SB	VTUN
□	230	.40	.06	24B
▽	231	.40	.09	24B

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LATERAL CYCLIC

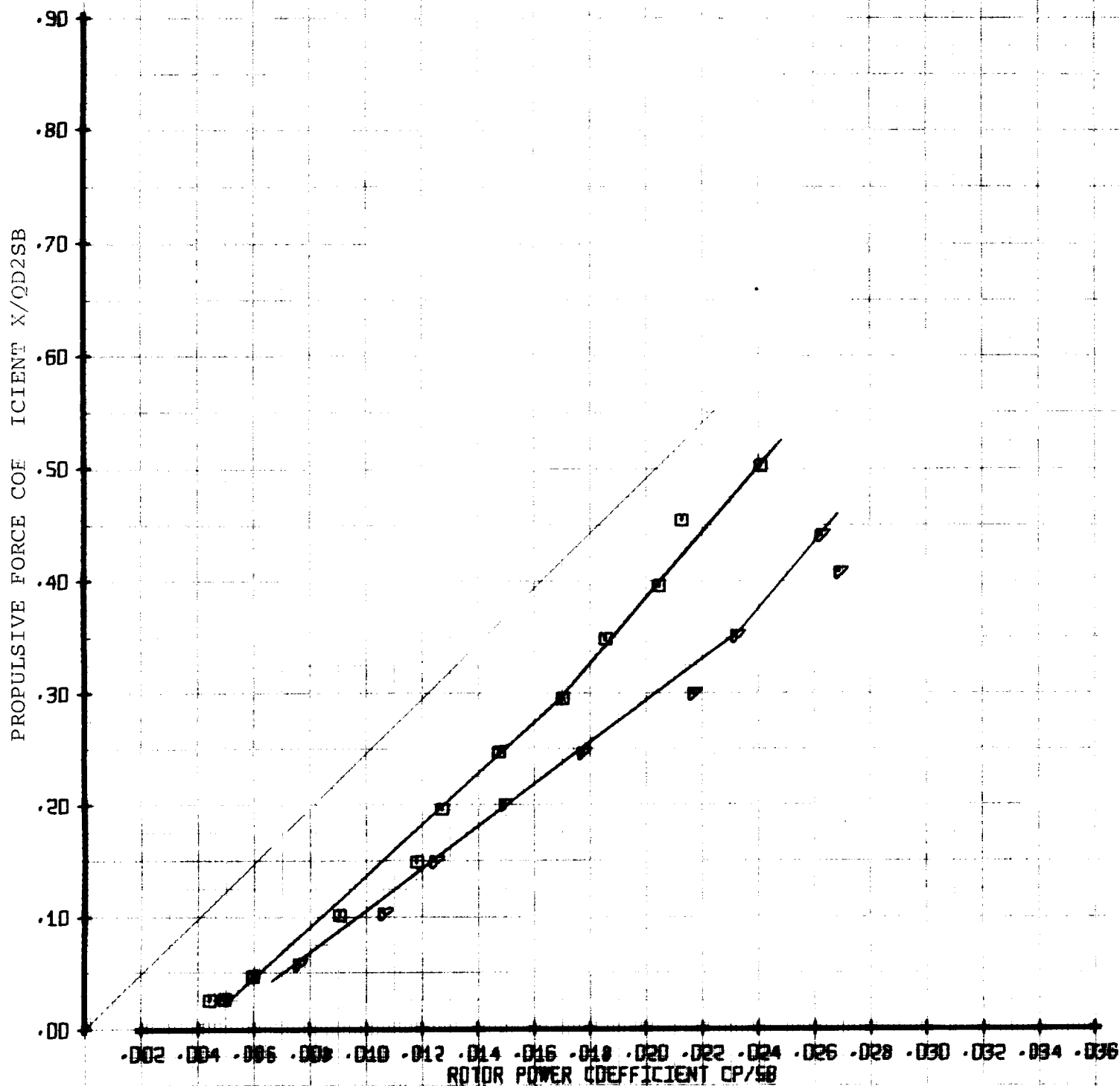


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CI'/SB	VTUN
□	230	.40	.06	248
▽	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR POWER COEFFICIENT

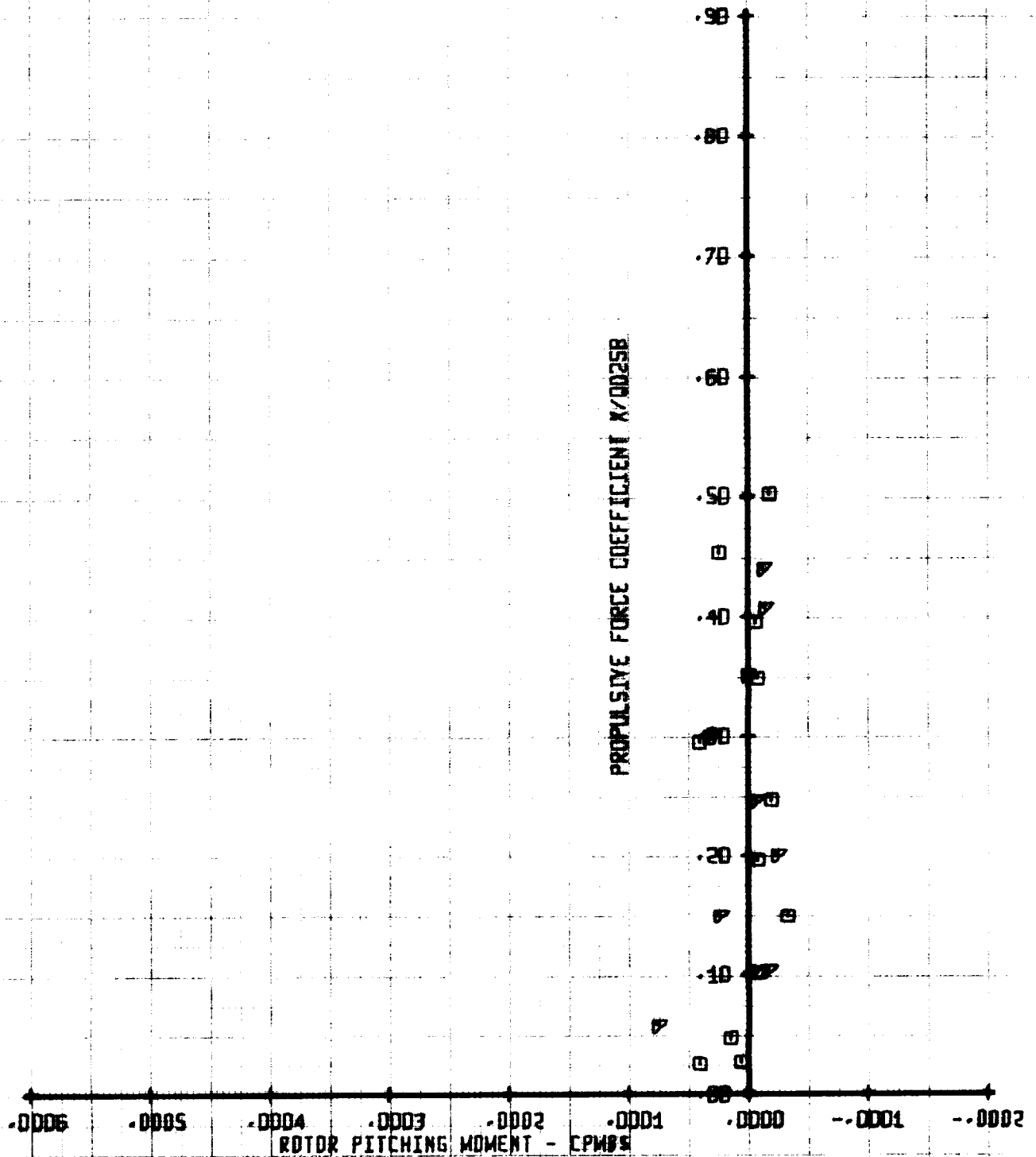


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/SB	VTUN
□	230	.40	.06	24B
▽	231	.40	.09	24B

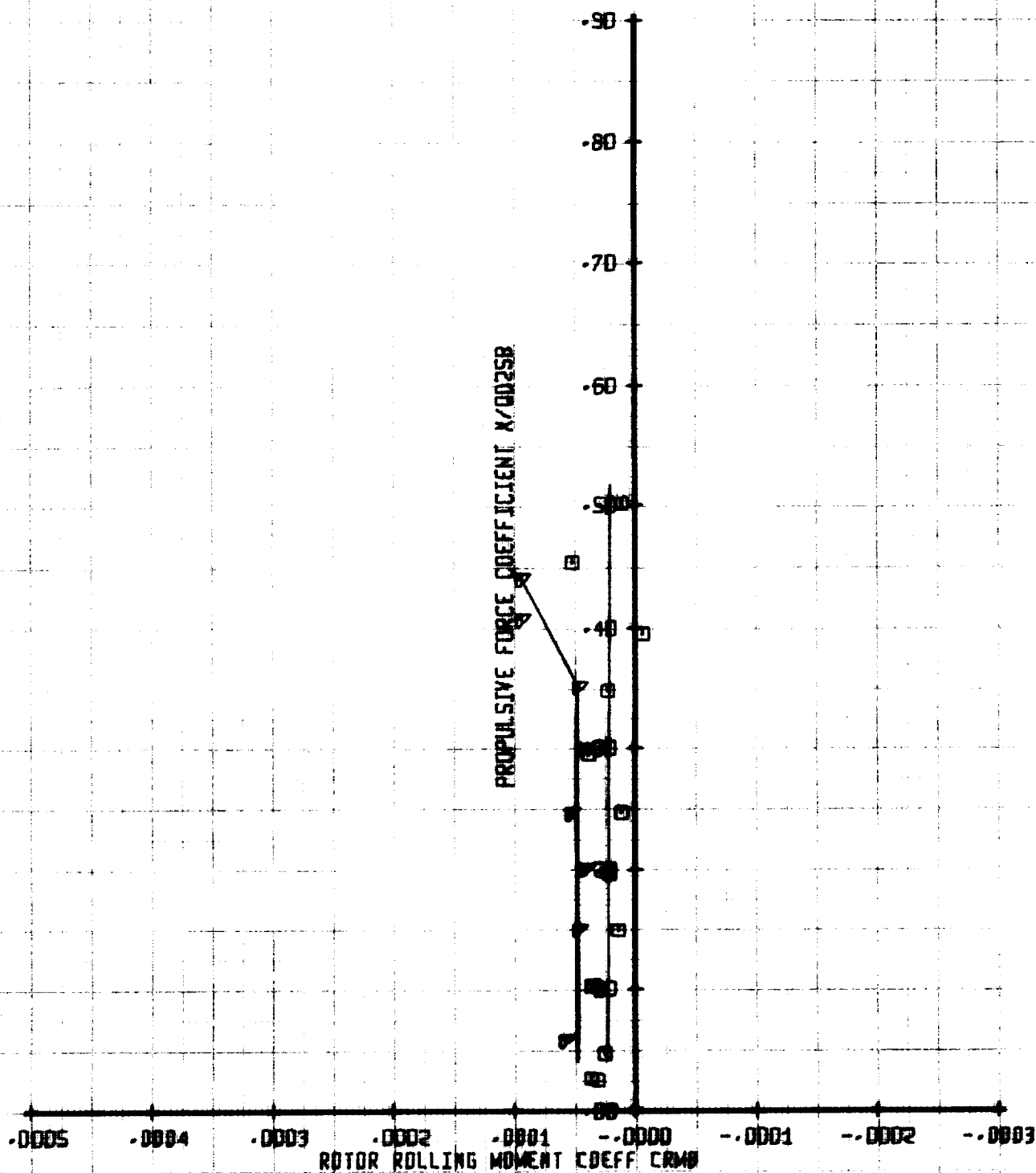
PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PITCHING MOMENT



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND				
SYM	RUN	ML'	CT'/SB	VTUN
□	230	.40	.06	240
△	231	.40	.09	240

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR ROLLING MOMENT COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	MIN	ML'	CT'2SB	YTLN
□	230	.40	.06	248
▽	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR LONGITUDINAL FORCE COEFFICIENT

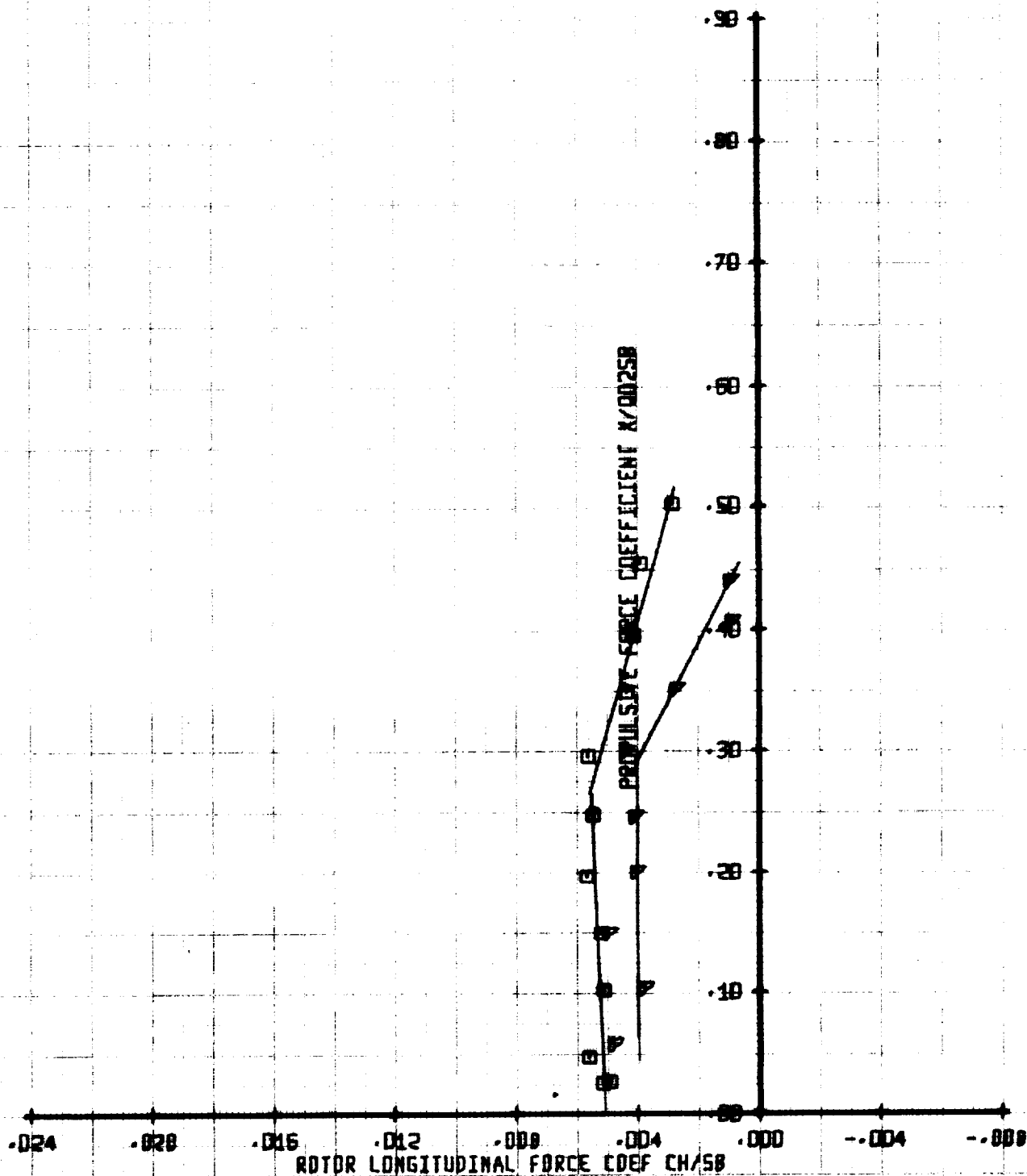


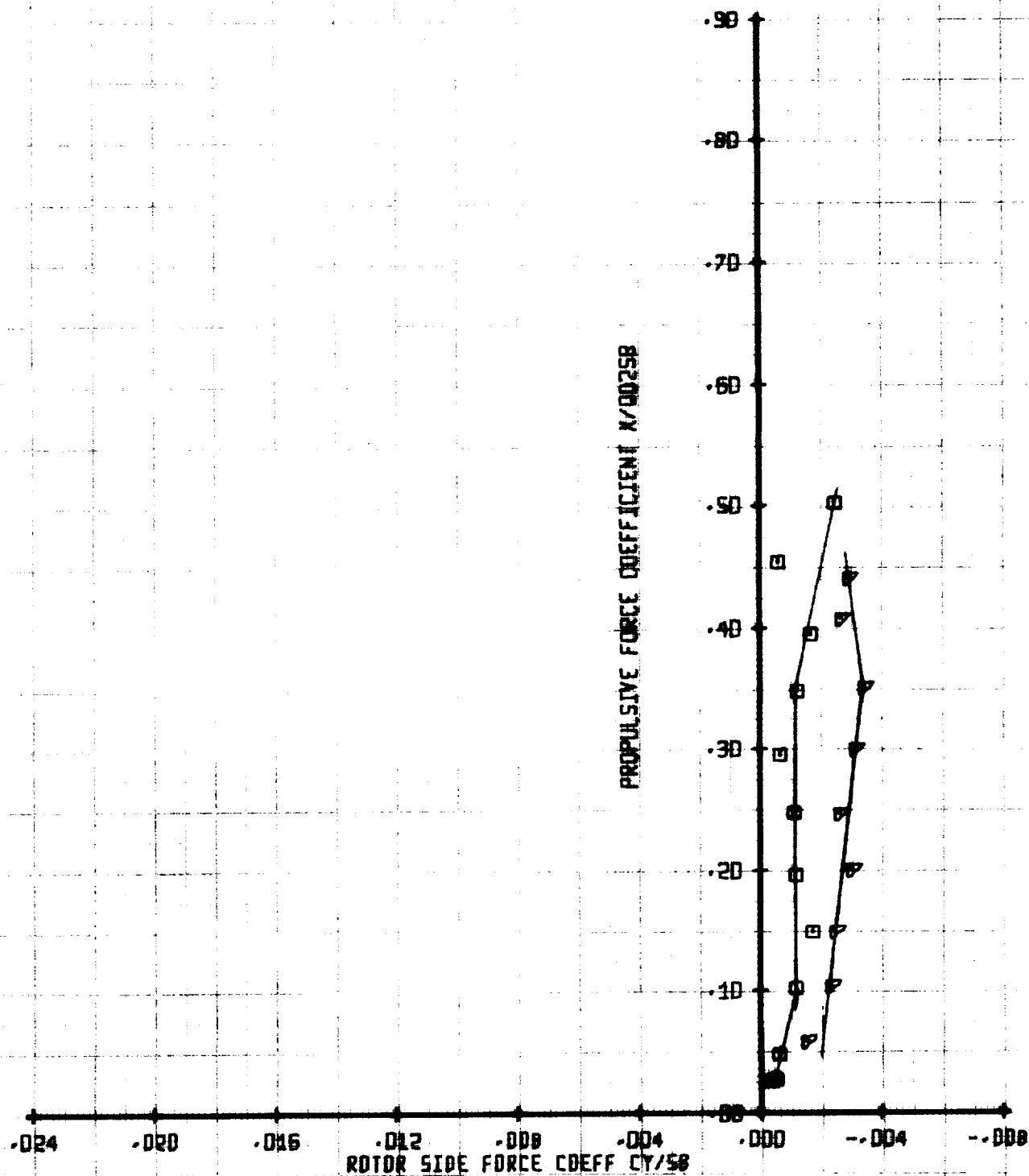
Figure B-33

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	VTLM
□	230	.40	.06	248
▽	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT

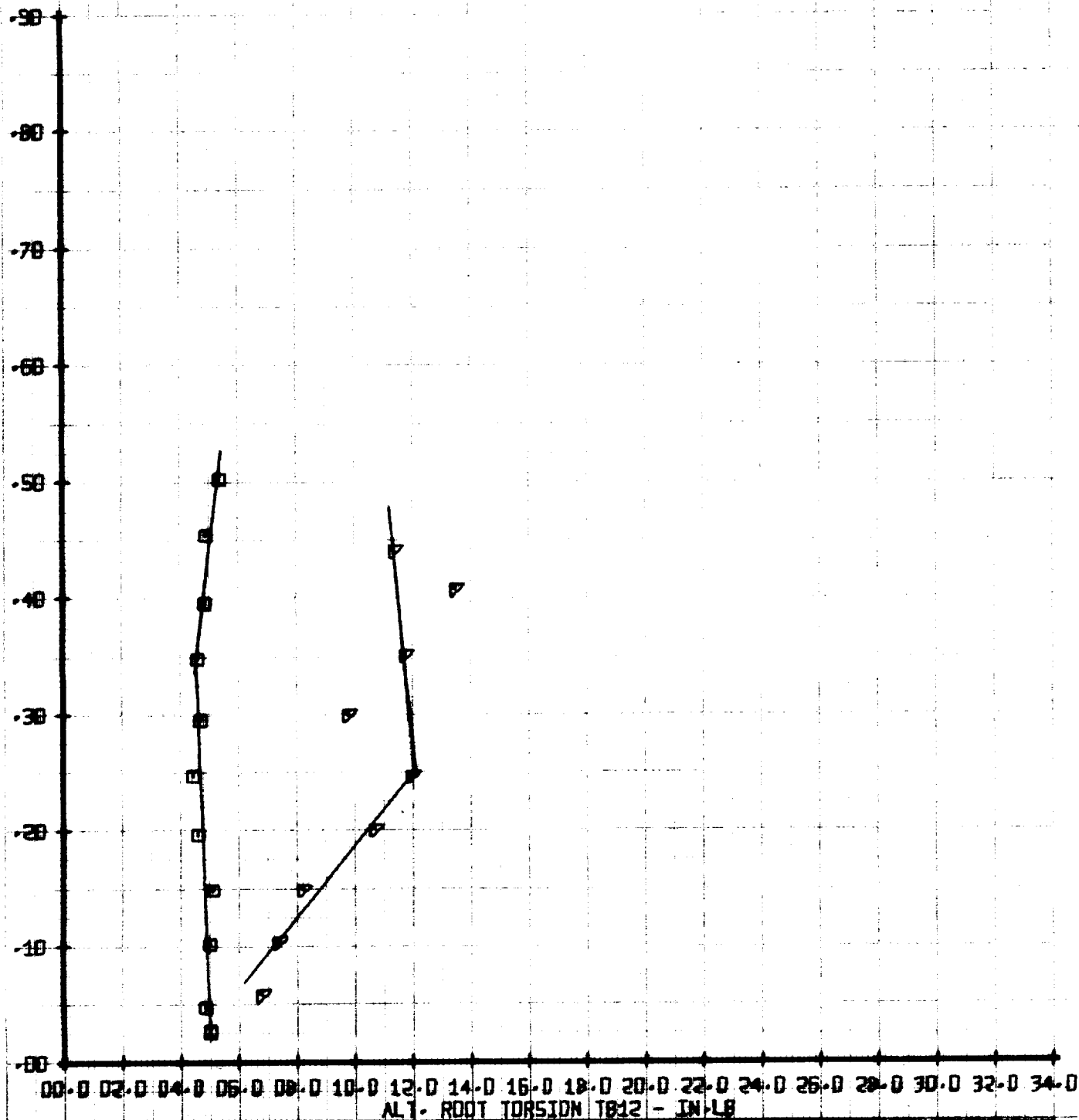


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND				
SYM	RUN	MI'	CT'Y58	YTLN
□	230	.40	.06	248
△	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

PROPULSIVE FORCE COEFFIC IT X/00258

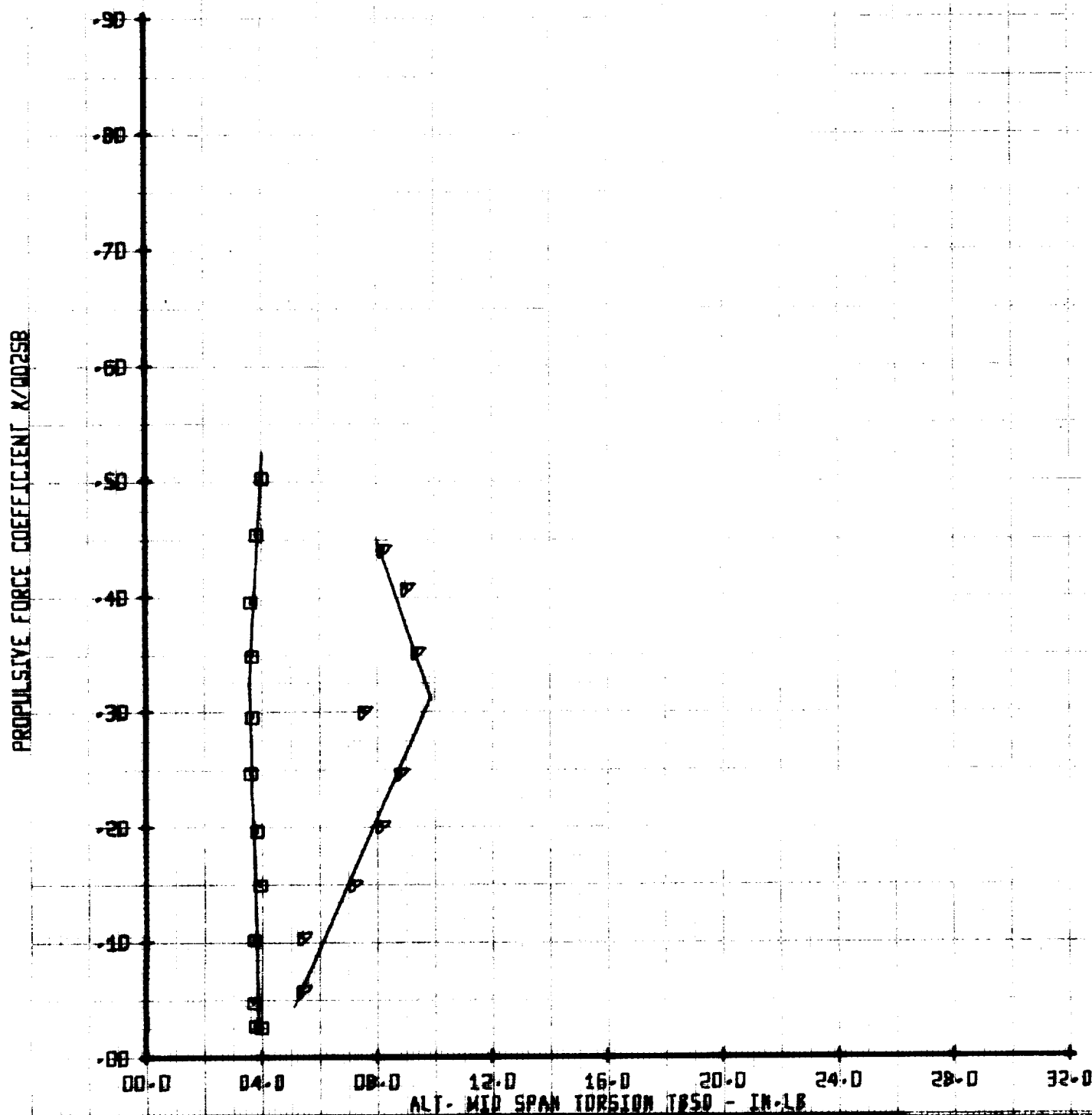


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'ZSB	VTUN
□	230	.40	.06	248
▽	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50

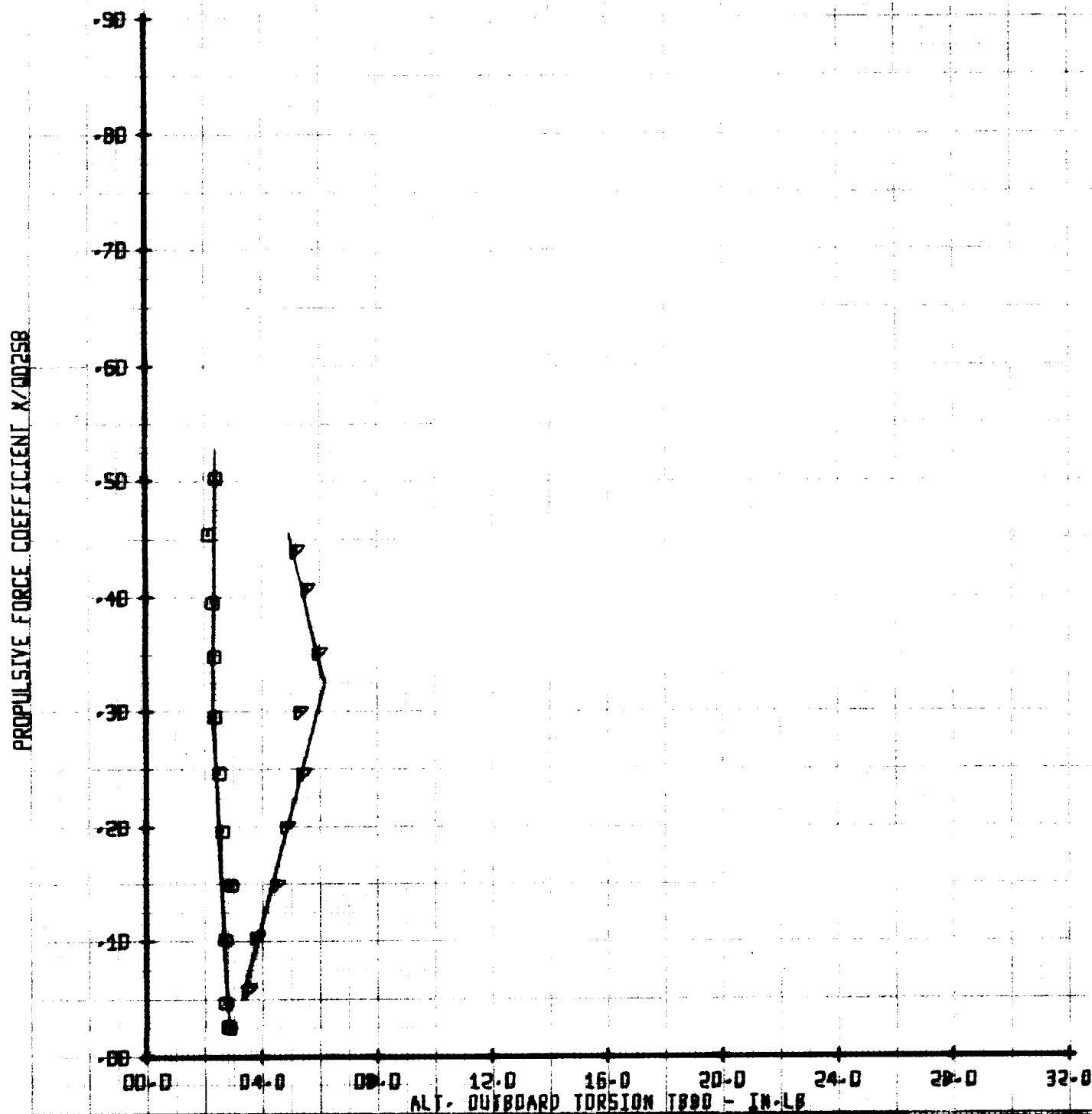


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT' / SB	VTUN
□	230	.40	.06	240
△	231	.40	.09	240

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING OUTBOARD TORSION TB80

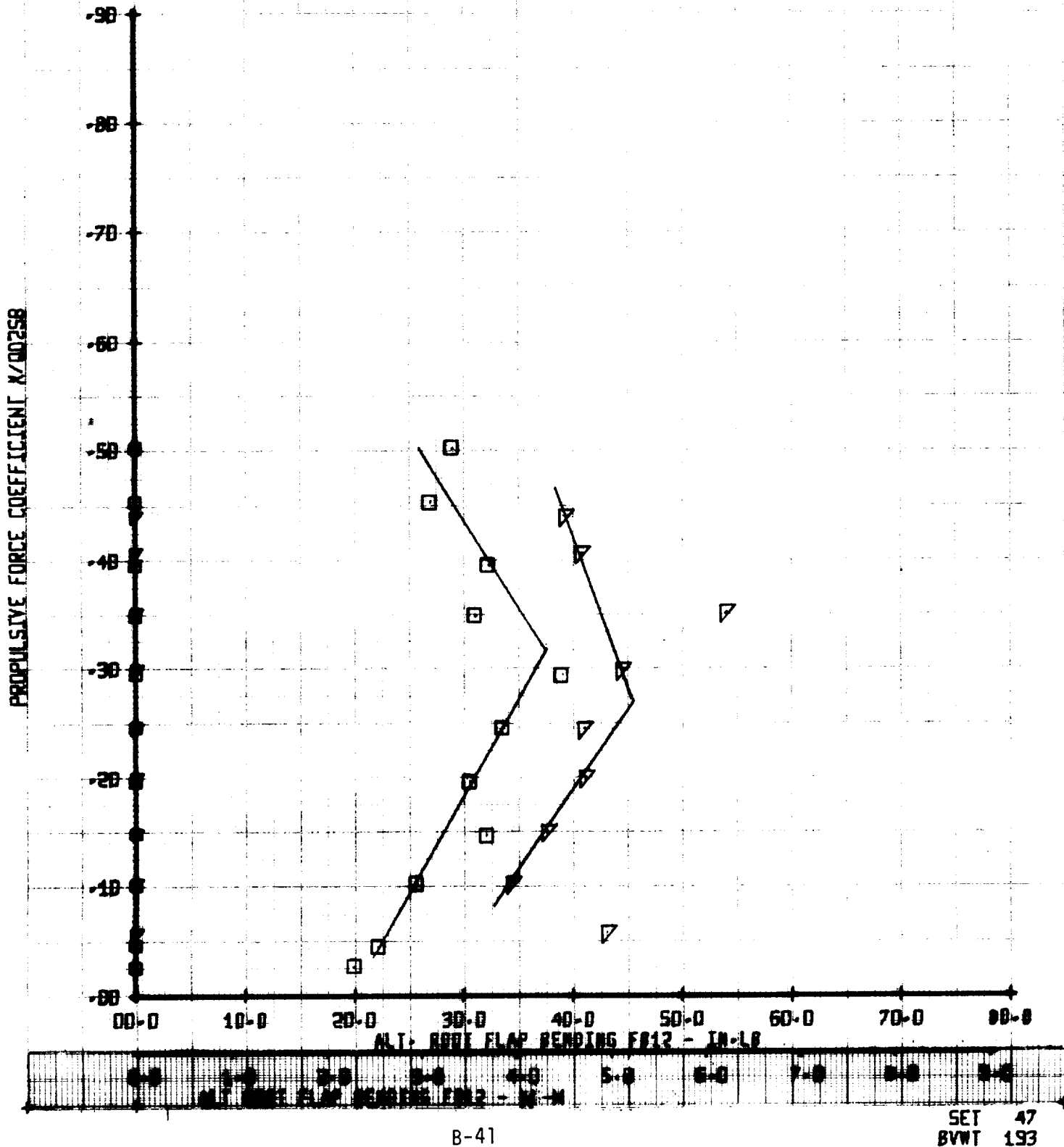


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT'/SS	VTUN
□	230	.40	.06	240
▽	231	.40	.09	240

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

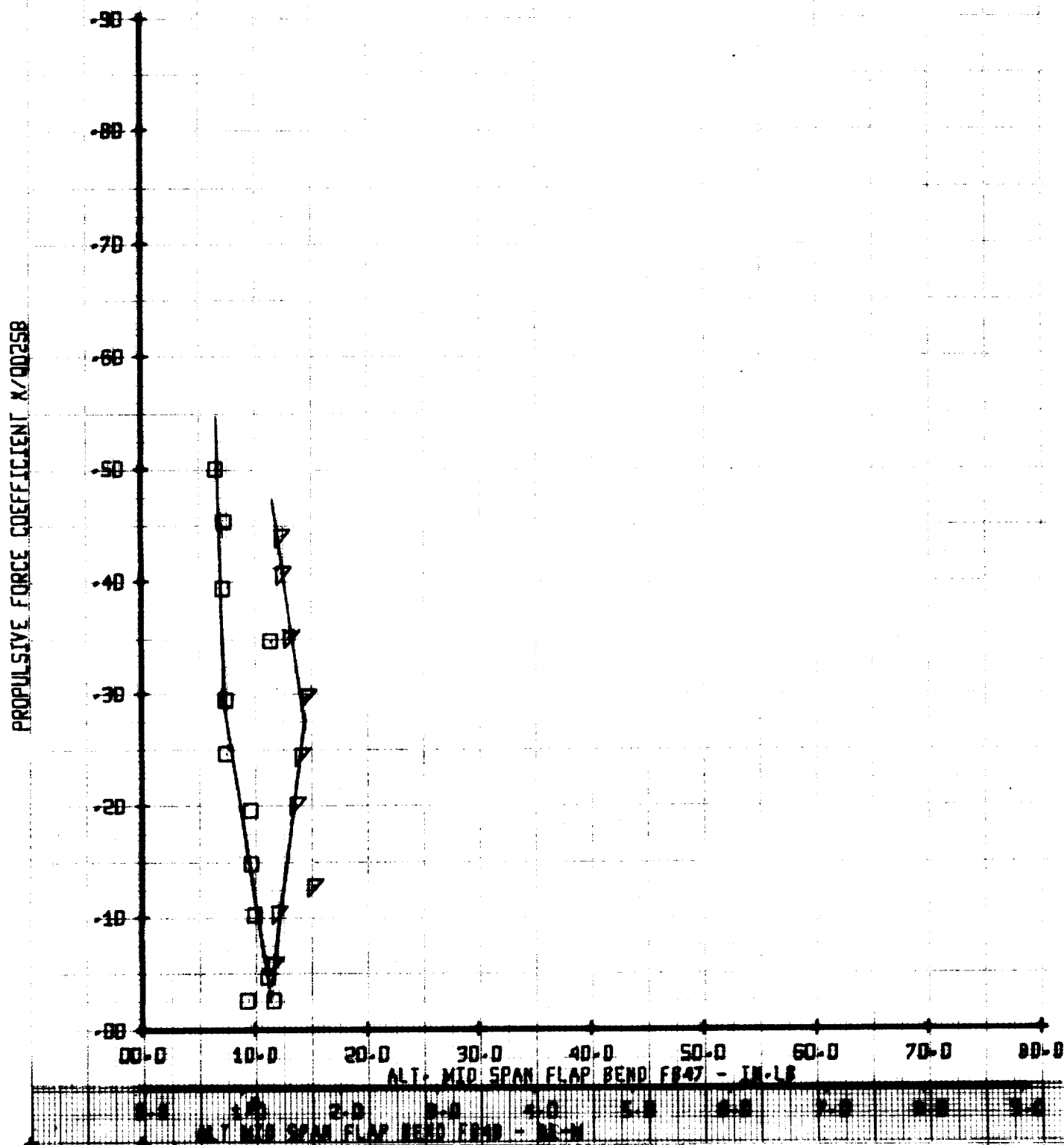


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B MOTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VTUN
□	230	.40	.06	240
▽	231	.40	.09	240

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING MID SPAN FLAP BENDING FB47

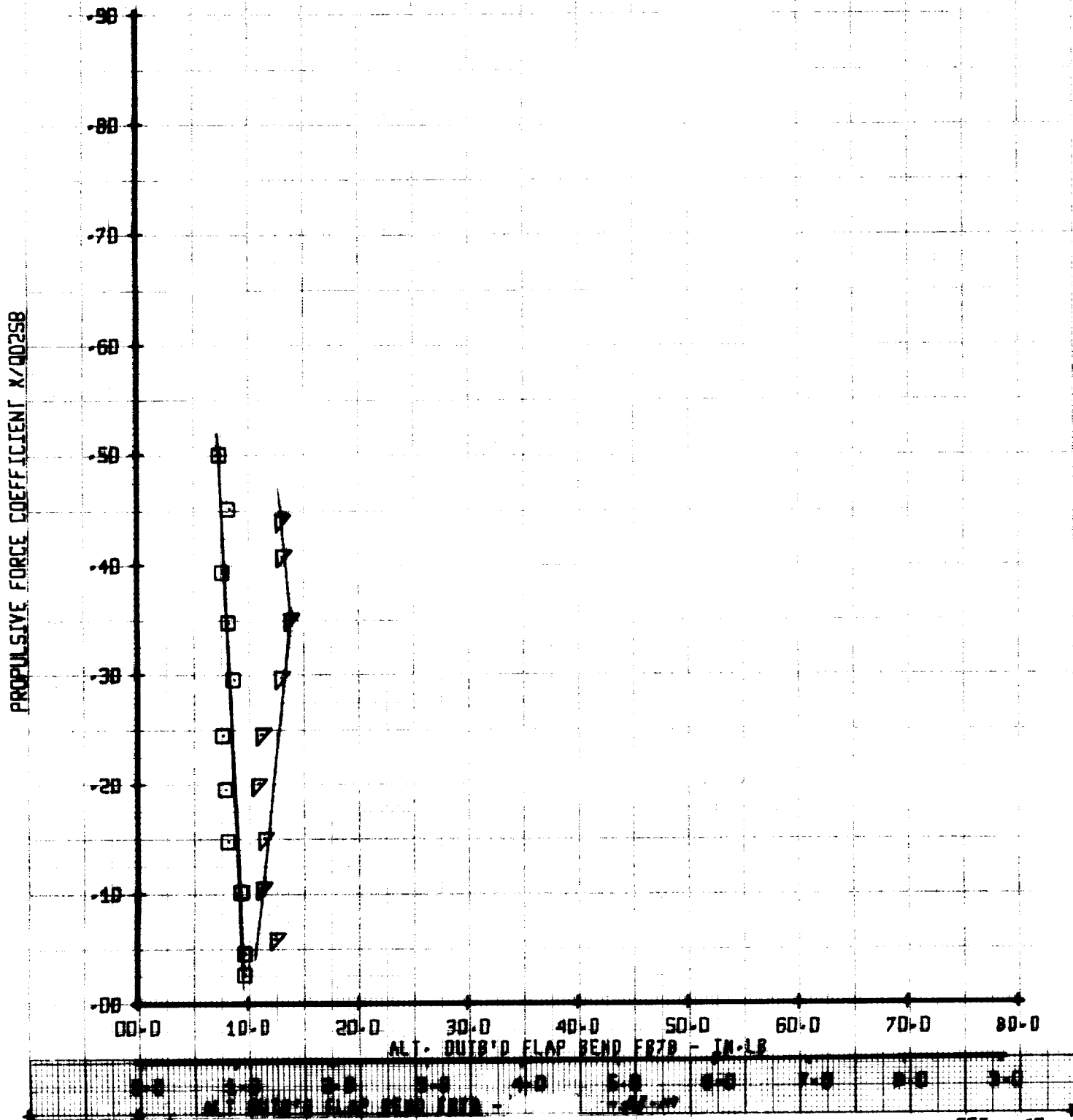


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/SB	VTUN
□	230	.40	.06	248
▽	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING OUTBOARD FLAP BENDING FB78

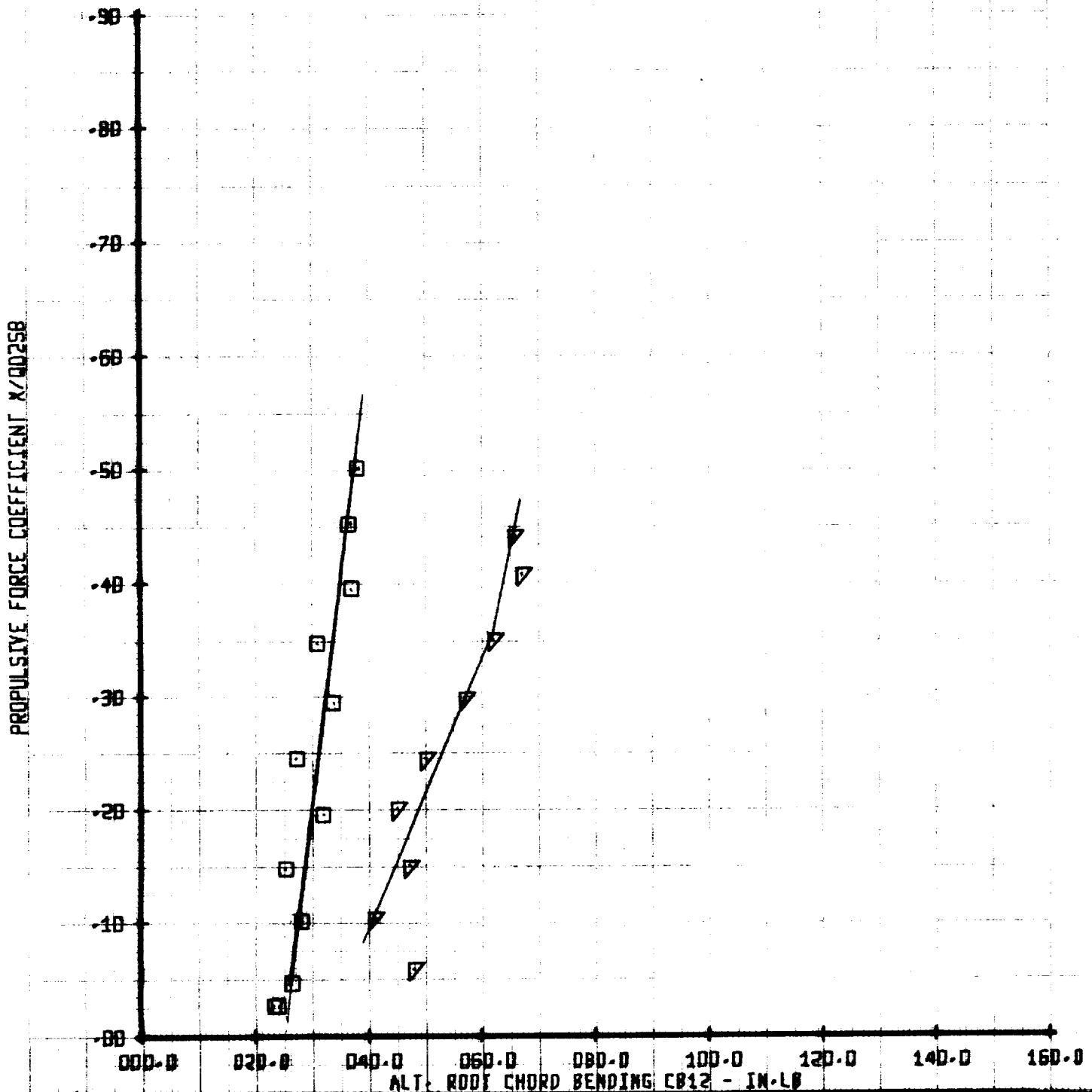


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'258	VTUN
□	230	.40	.06	248
▽	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

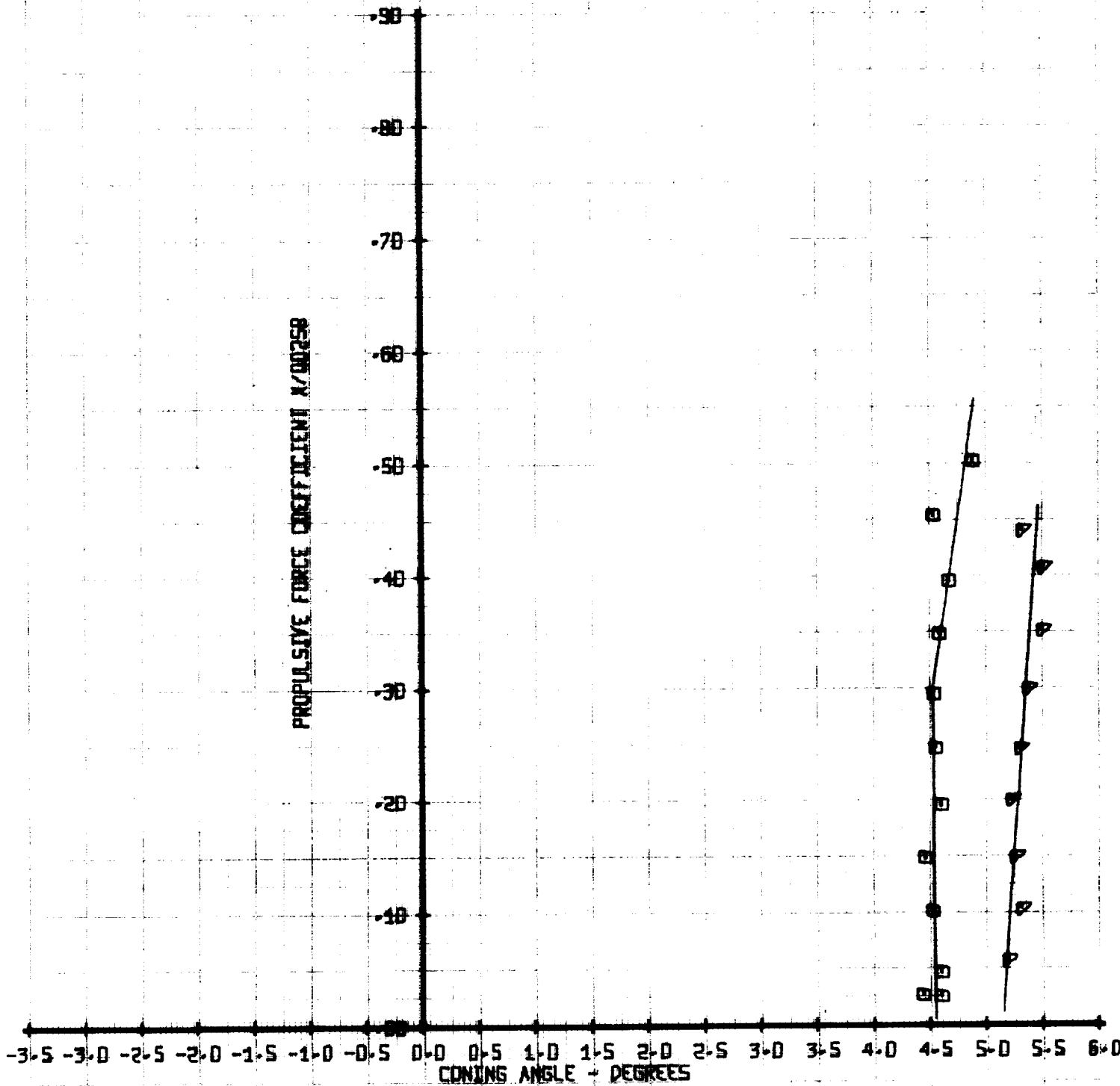


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / 258	Y/TUN
□	230	.40	.06	248
△	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 CONING ANGLE

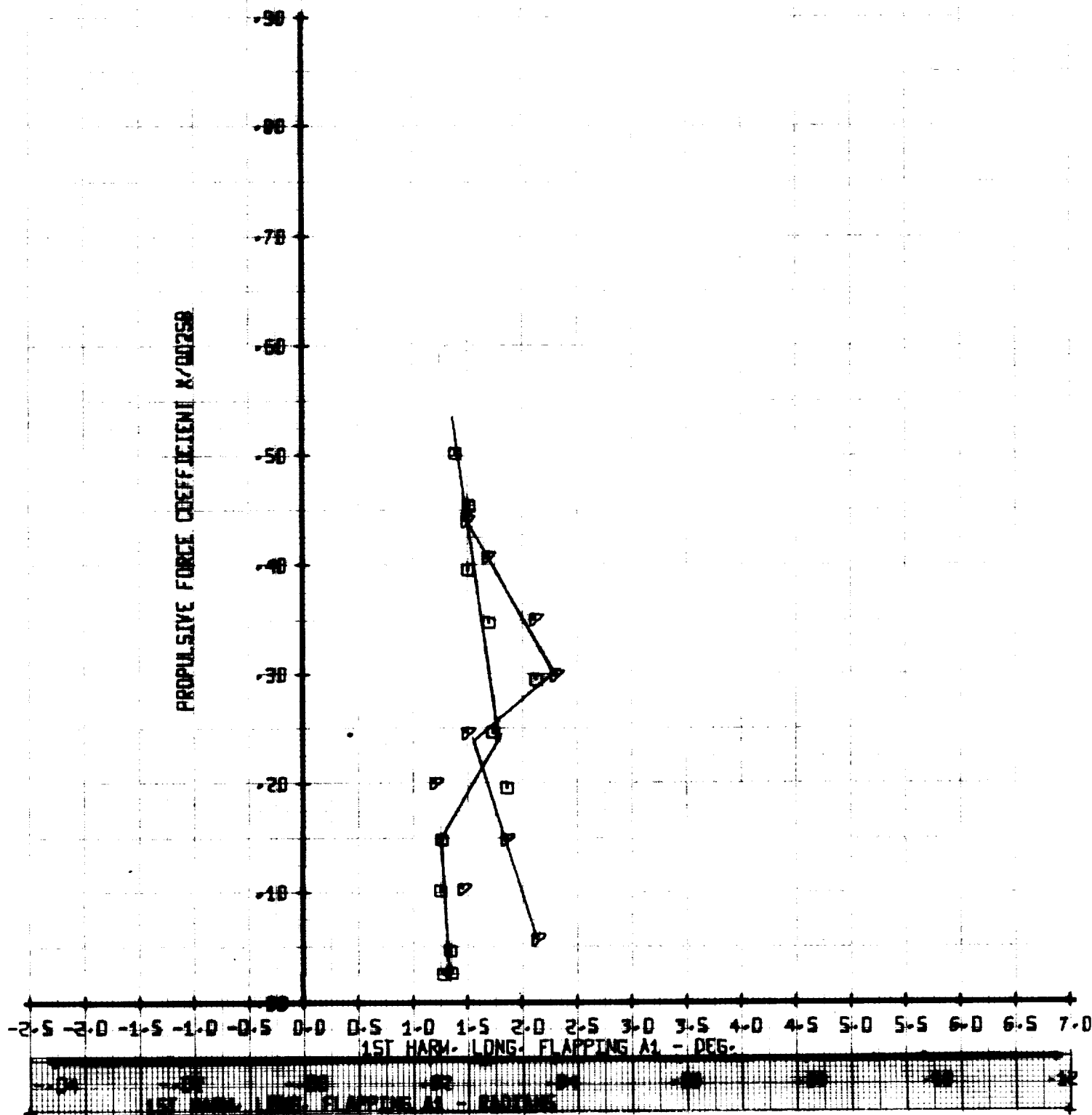


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MLP	CT'Y58	YTUN
□	230	.40	.06	248
△	231	.40	.09	248

PROPULSIVE FORCE COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1

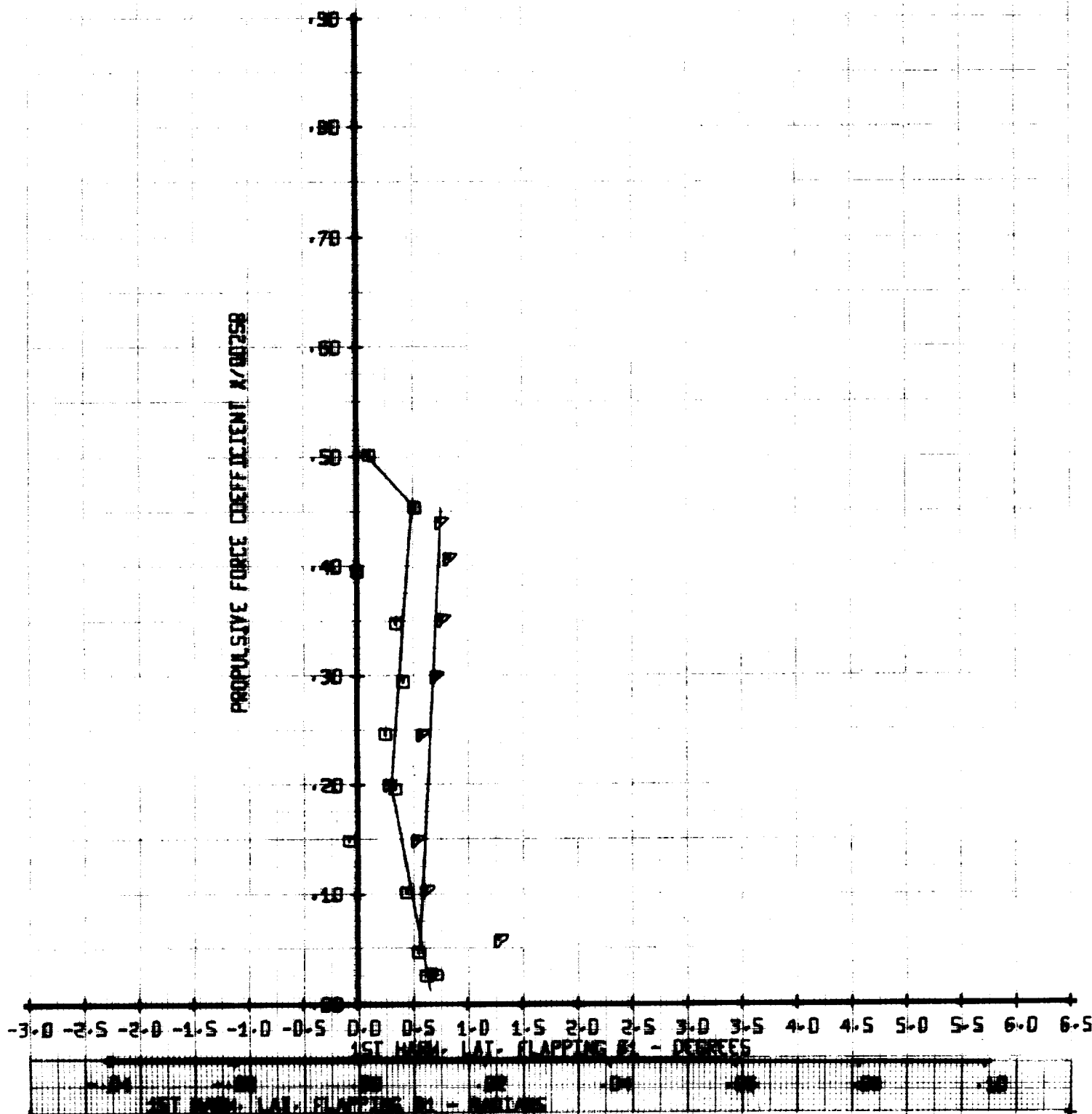


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	VTUN
□	230	.40	.06	240
△	231	.40	.09	240

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 1ST HARMONIC LATERAL FLAPPING B1

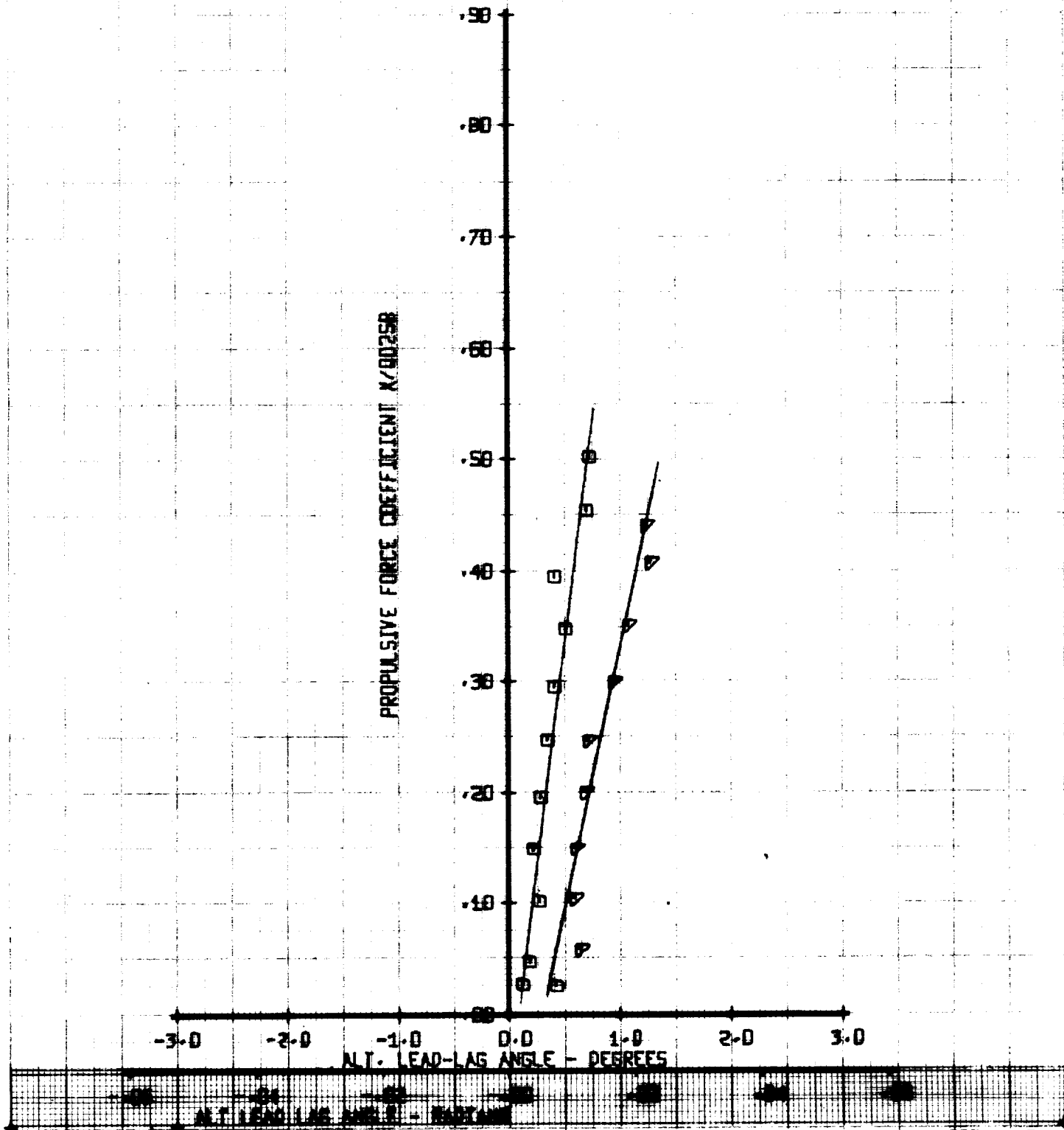


SET 47
 BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

SYN		LEGEND		CT' / 58		YTUN	
0	230	0.40	0.06	248			
9	231	0.40	0.09	248			

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING LEAD-LAG ANGLE

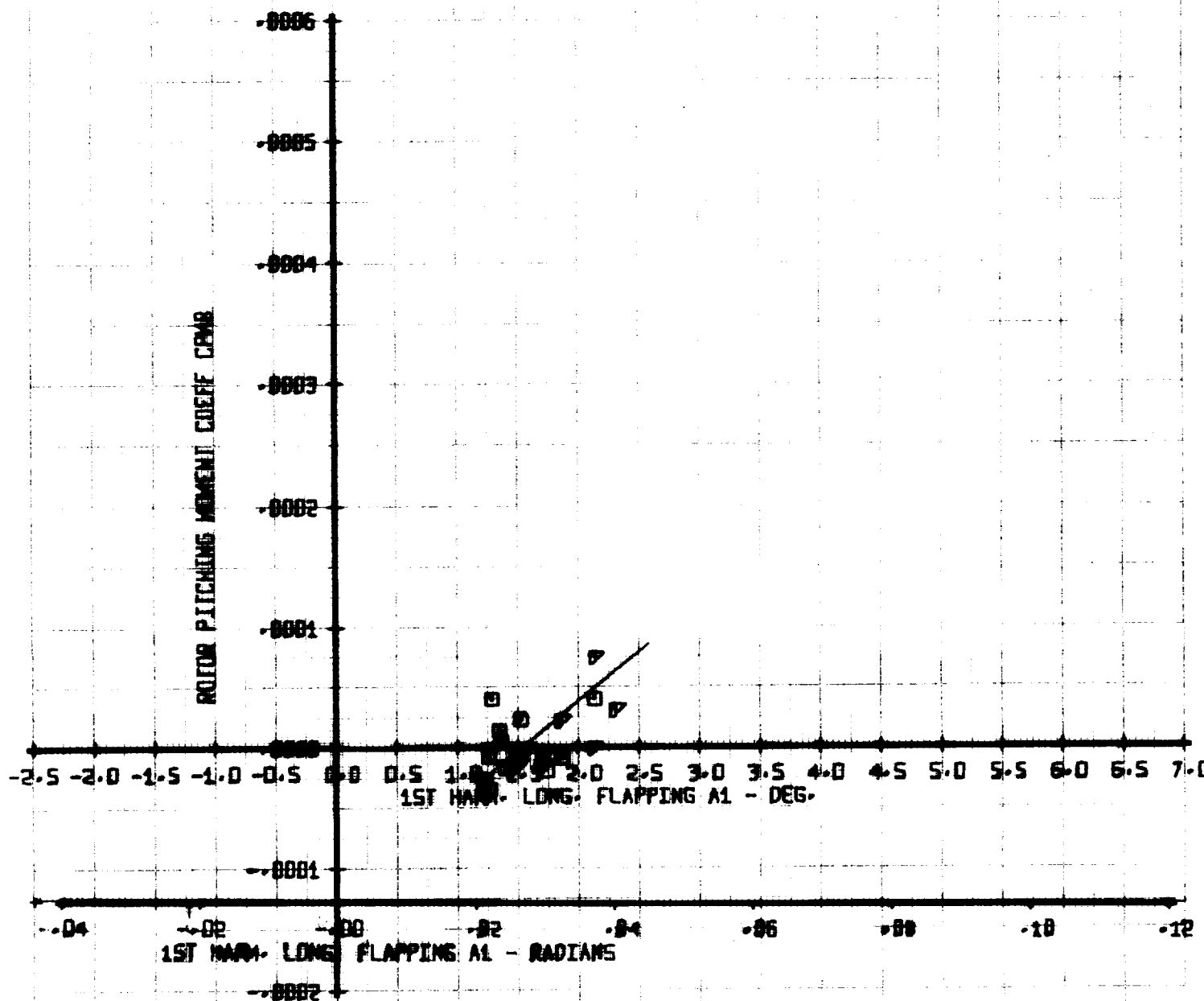


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	YTUN
□	230	.40	.06	248
▽	231	.40	.09	248

ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1



LEFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	YTUN
0	230	.40	.06	248
9	231	.40	.09	248

ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

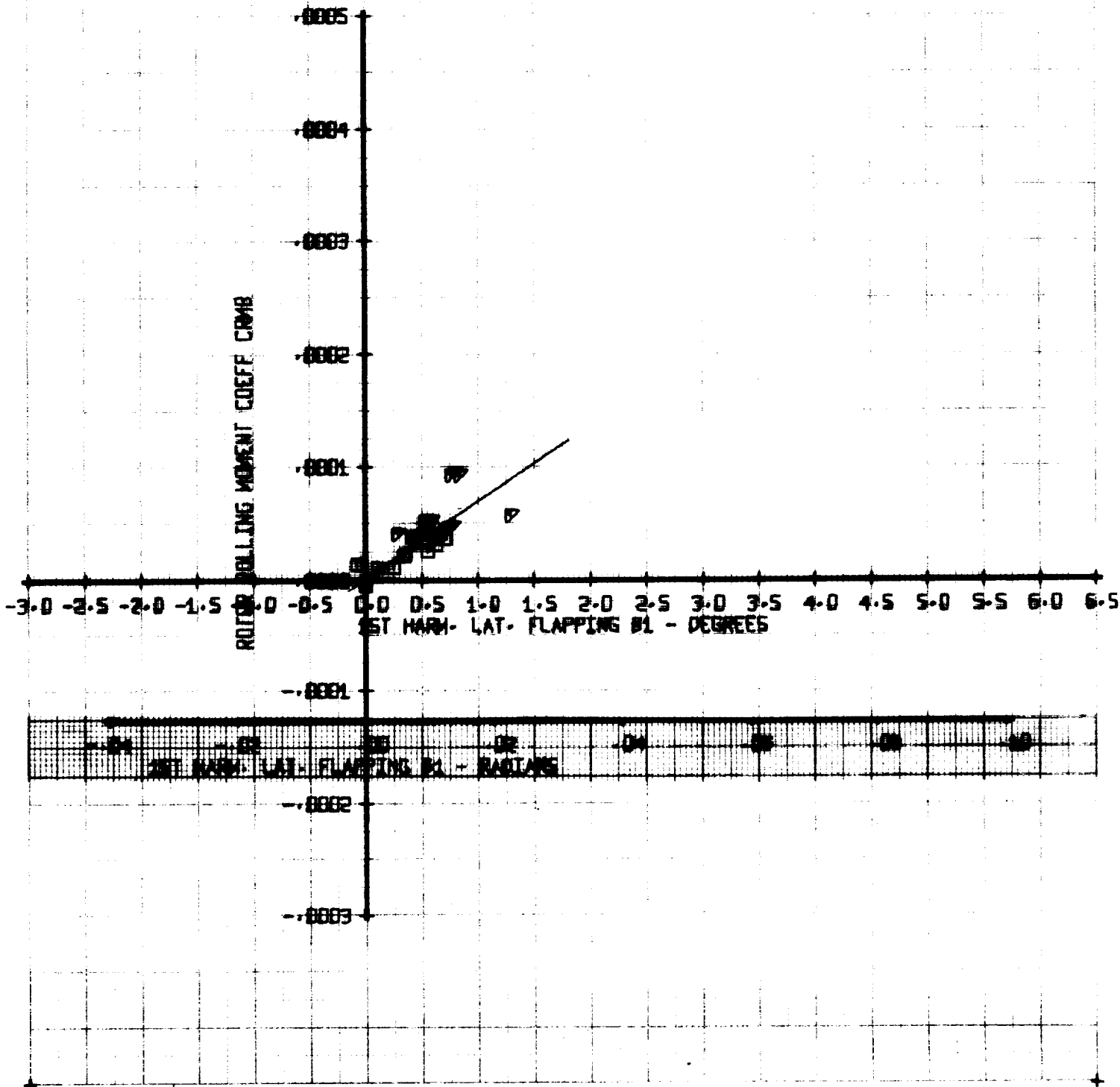


Figure B-47

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MU'	CT'/SB	VTUN
□	243	.45	.06	279
○	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PROPULSIVE FORCE COEFFICIENT

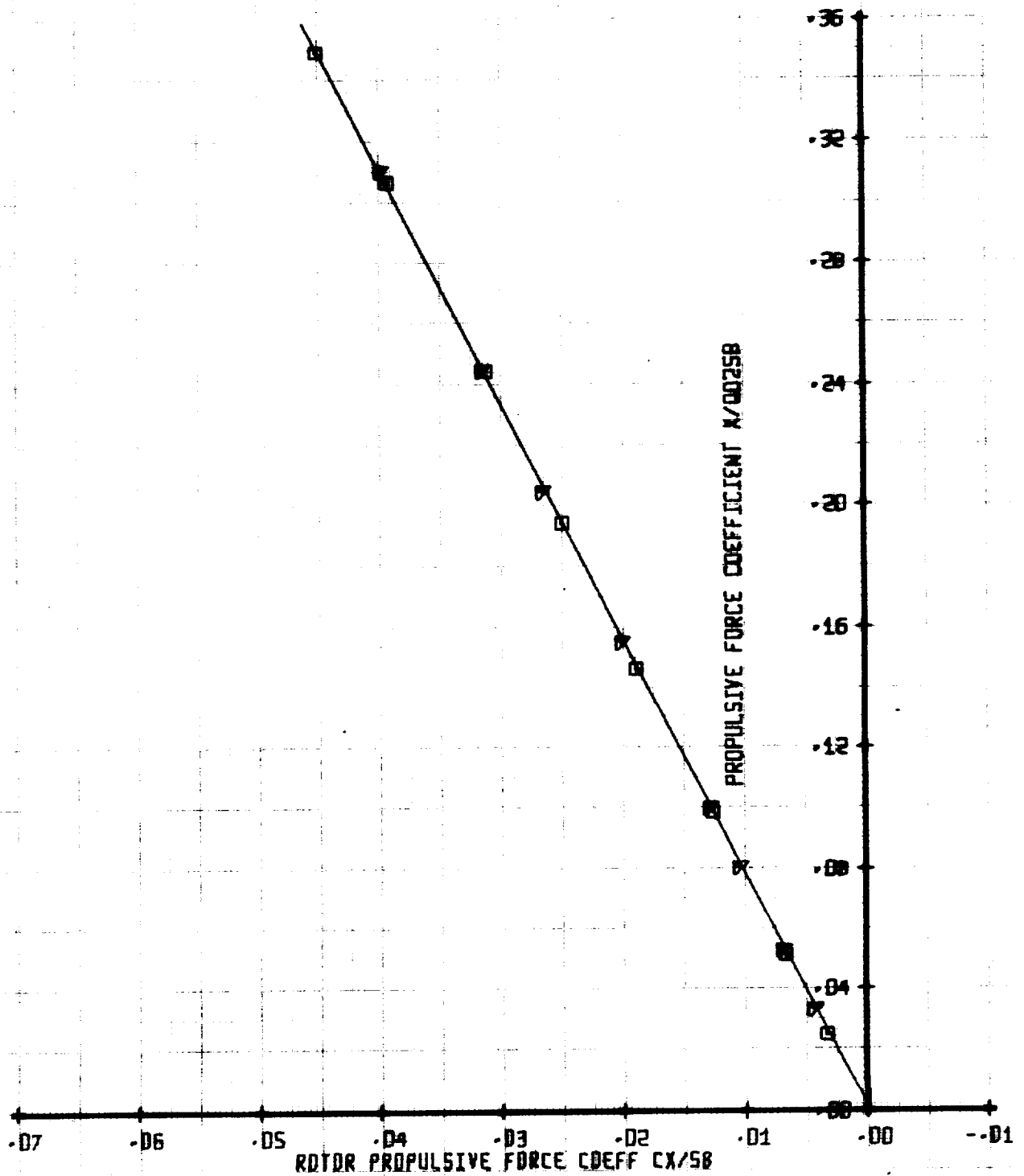


Figure B-48

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU	CT/58	VTUN
□	243	.45	.06	279
△	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 SHAFT ANGLE OF ATTACK

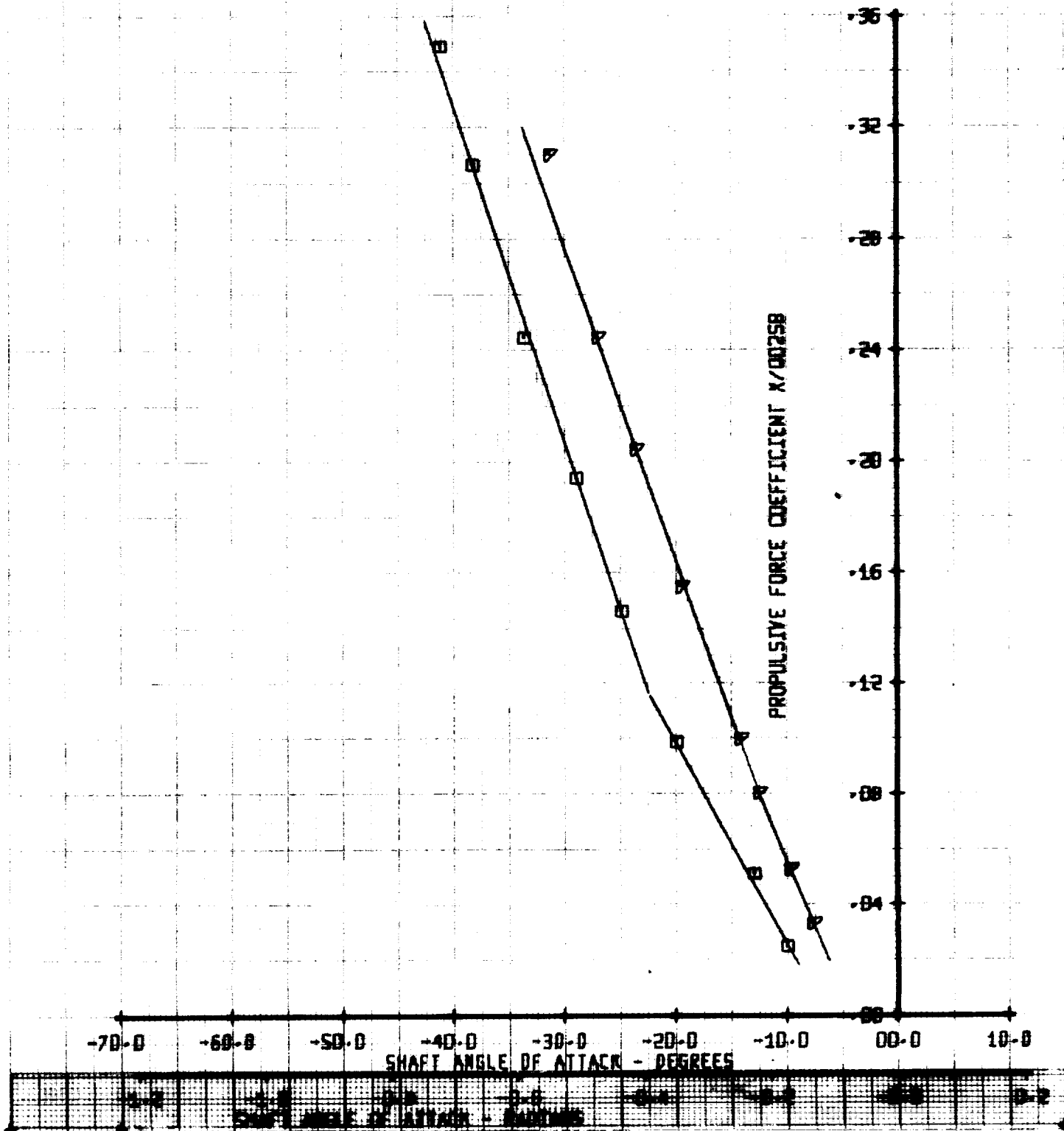


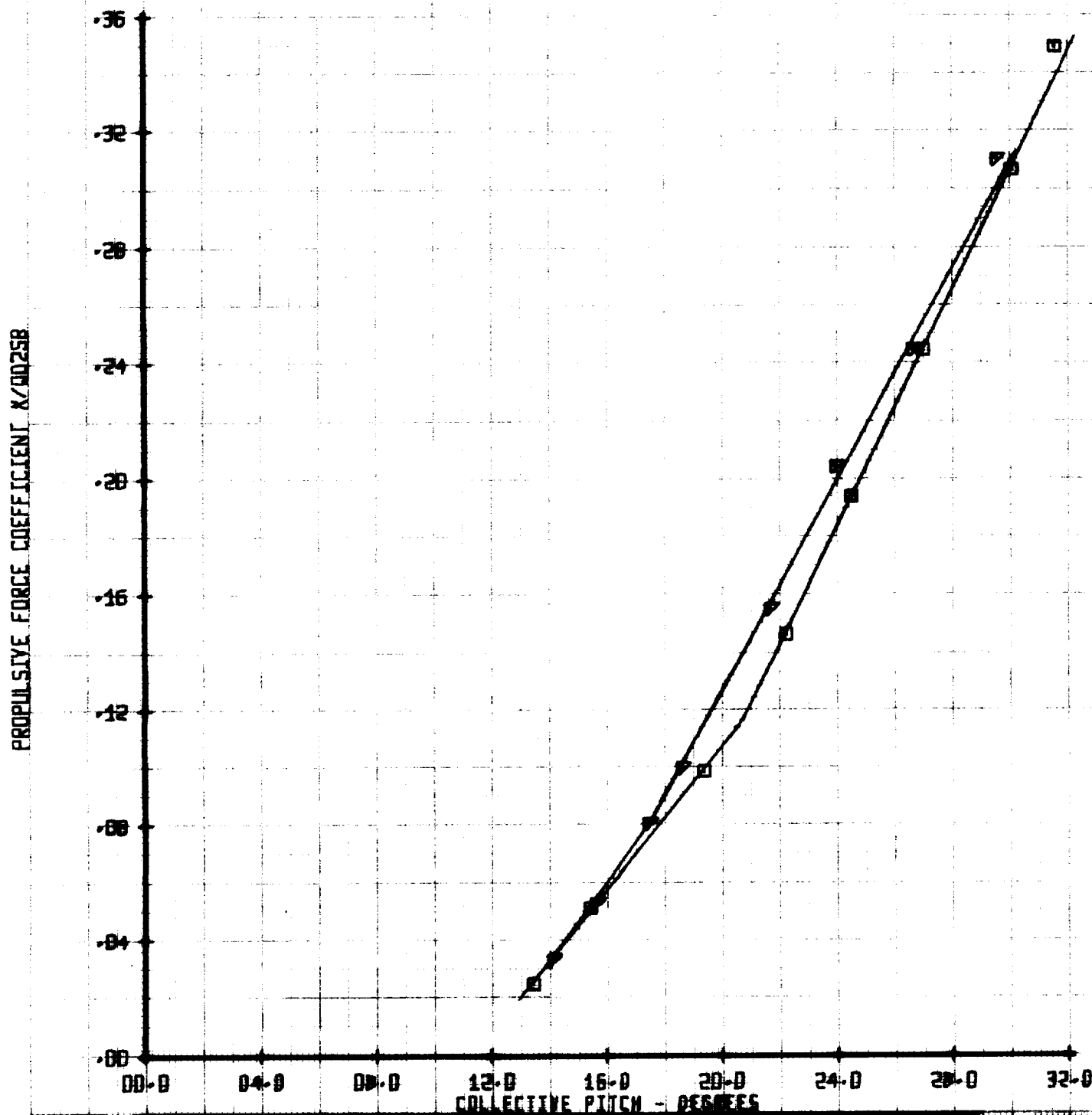
Figure B-49

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI	CT/58	VTUN
□	243	.45	.06	279
●	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
COLLECTIVE PITCH



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-42B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'758	VTUN
□	243	.45	.06	279
△	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LONGITUDINAL CYCLIC

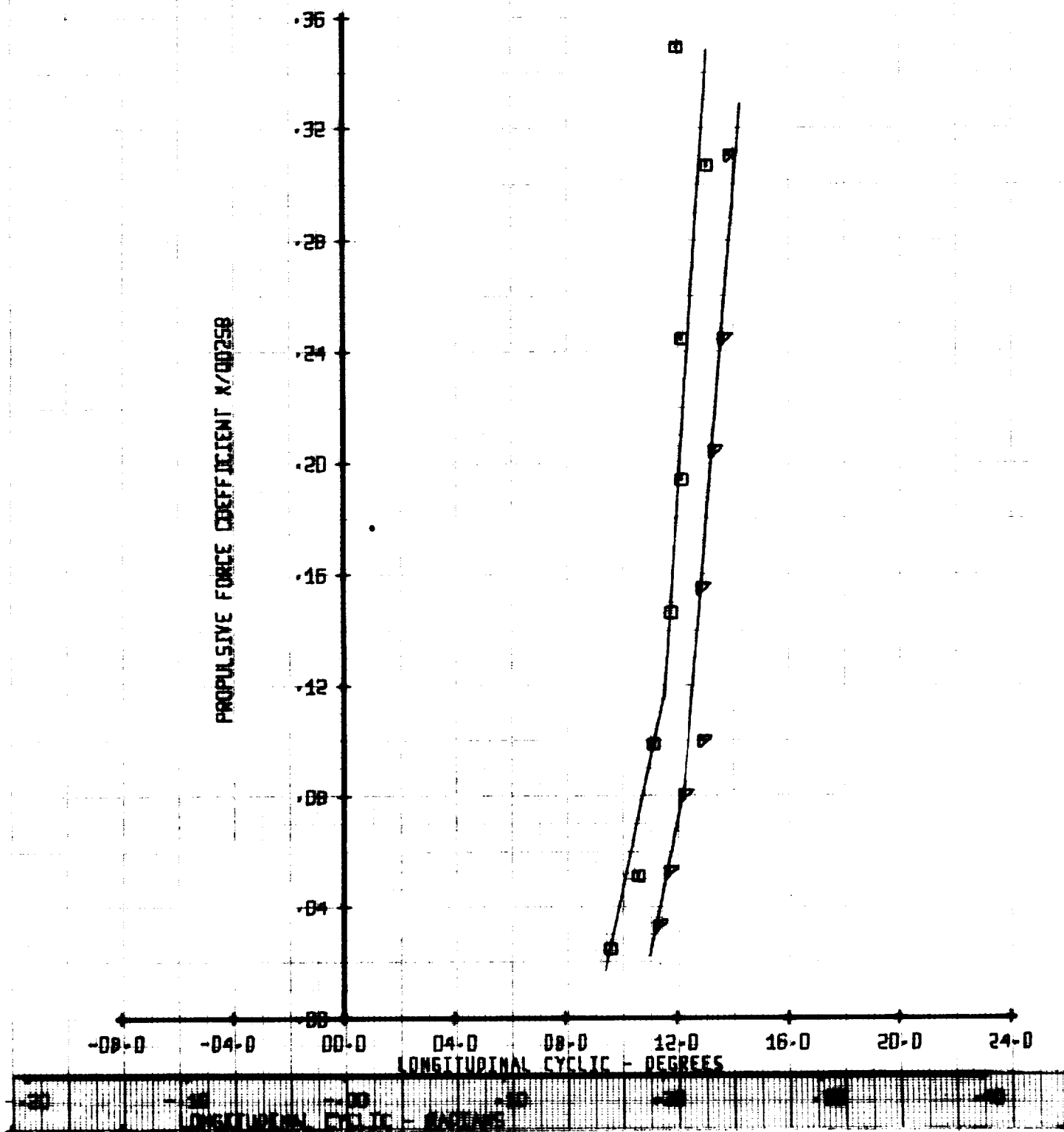


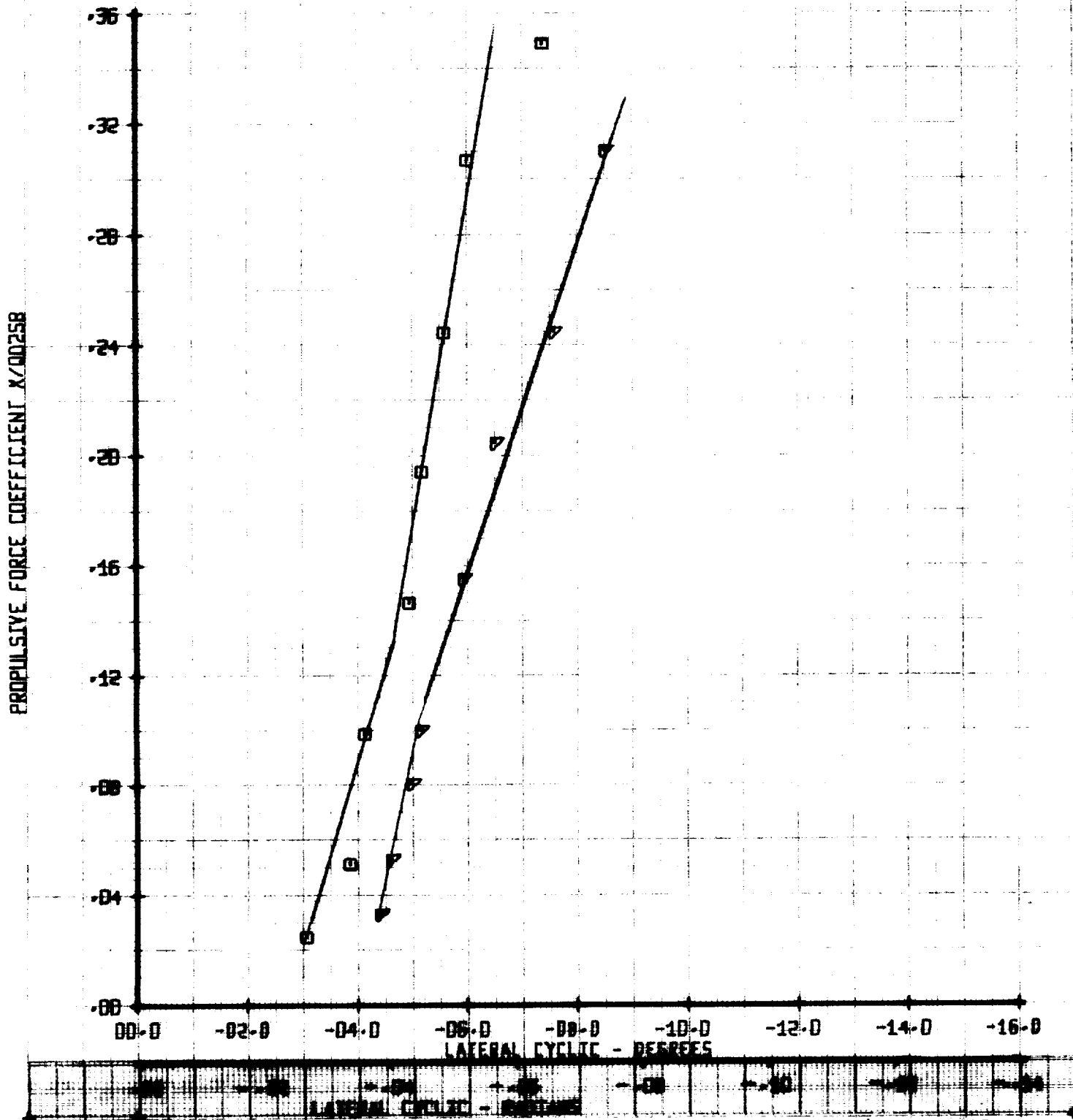
Figure B-51

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VTUN
□	243	.45	.06	279
△	244	.45	.076	279

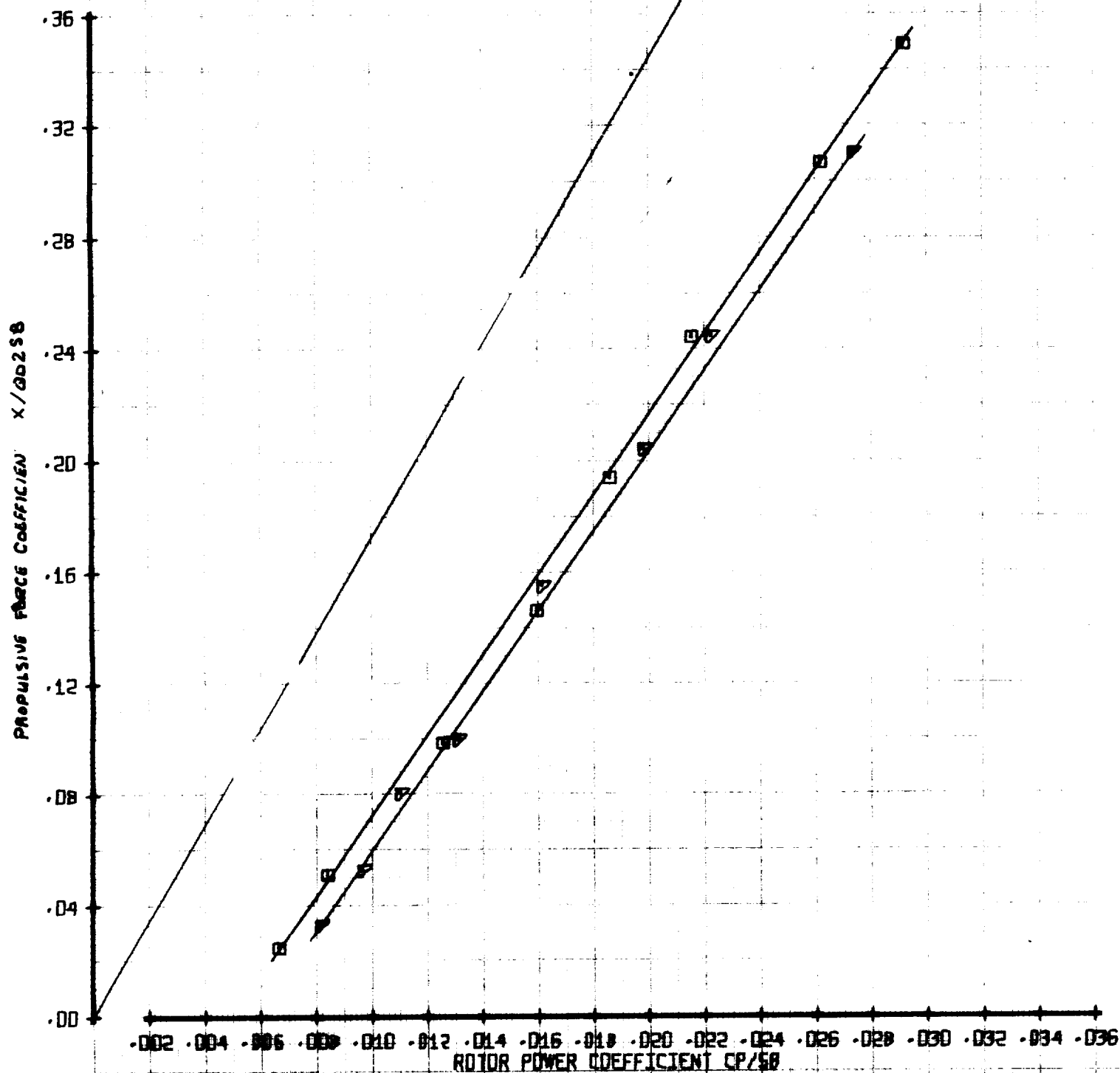
PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LATERAL CYCLIC



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND		MI'	CT'/SB	VTUN
SYM	RUN			
□	243	.45	.06	279
▽	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT

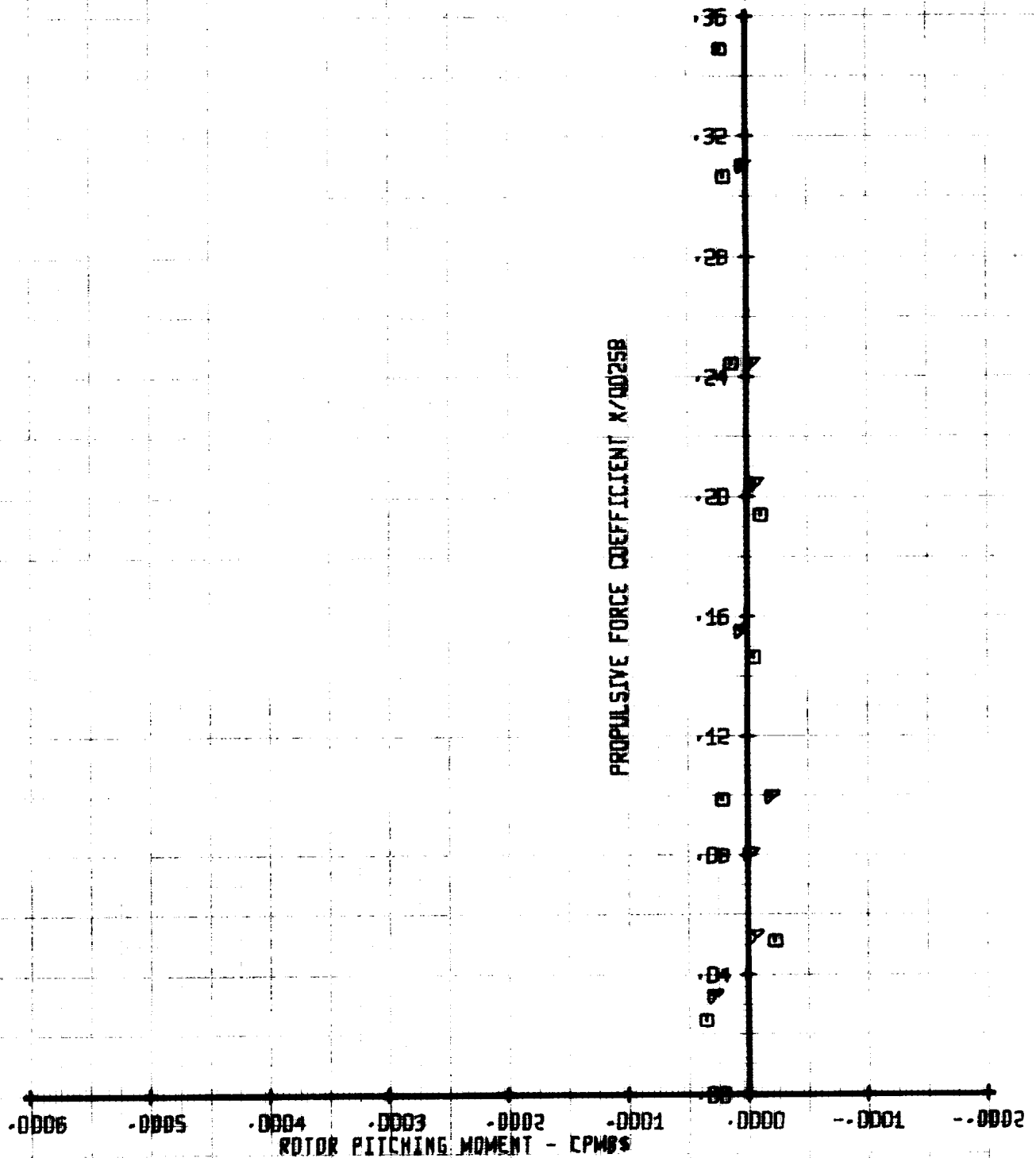


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU	CT/2SB	VTUM
□	243	.45	.06	279
△	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PITCHING MOMENT

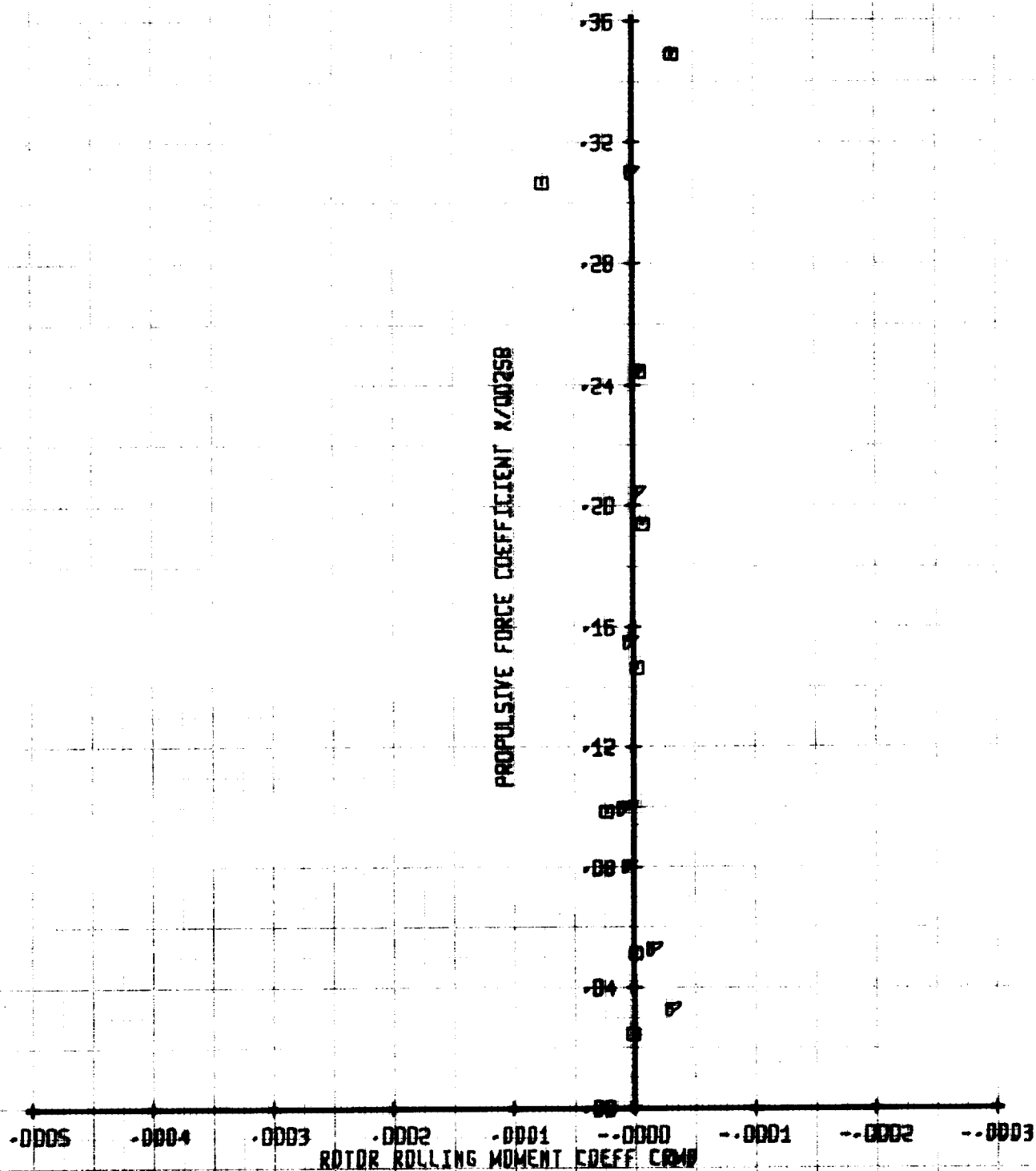


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT' / 58	VTUN
□	243	.45	.06	279
△	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR ROLLING MOMENT COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND		MI	CT/258	VTUN
SYM	RUN	.45	.06	279
8	243	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT

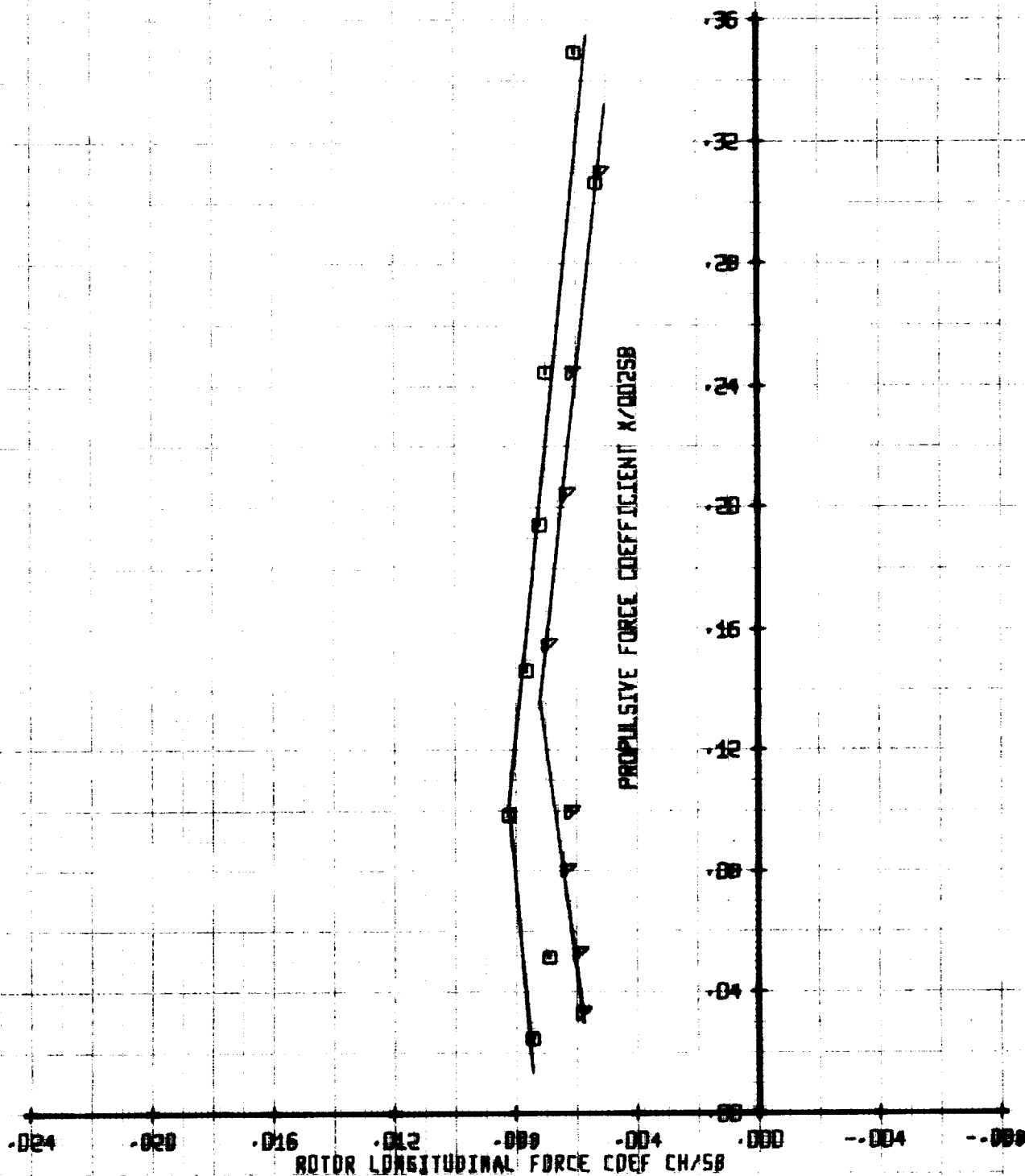
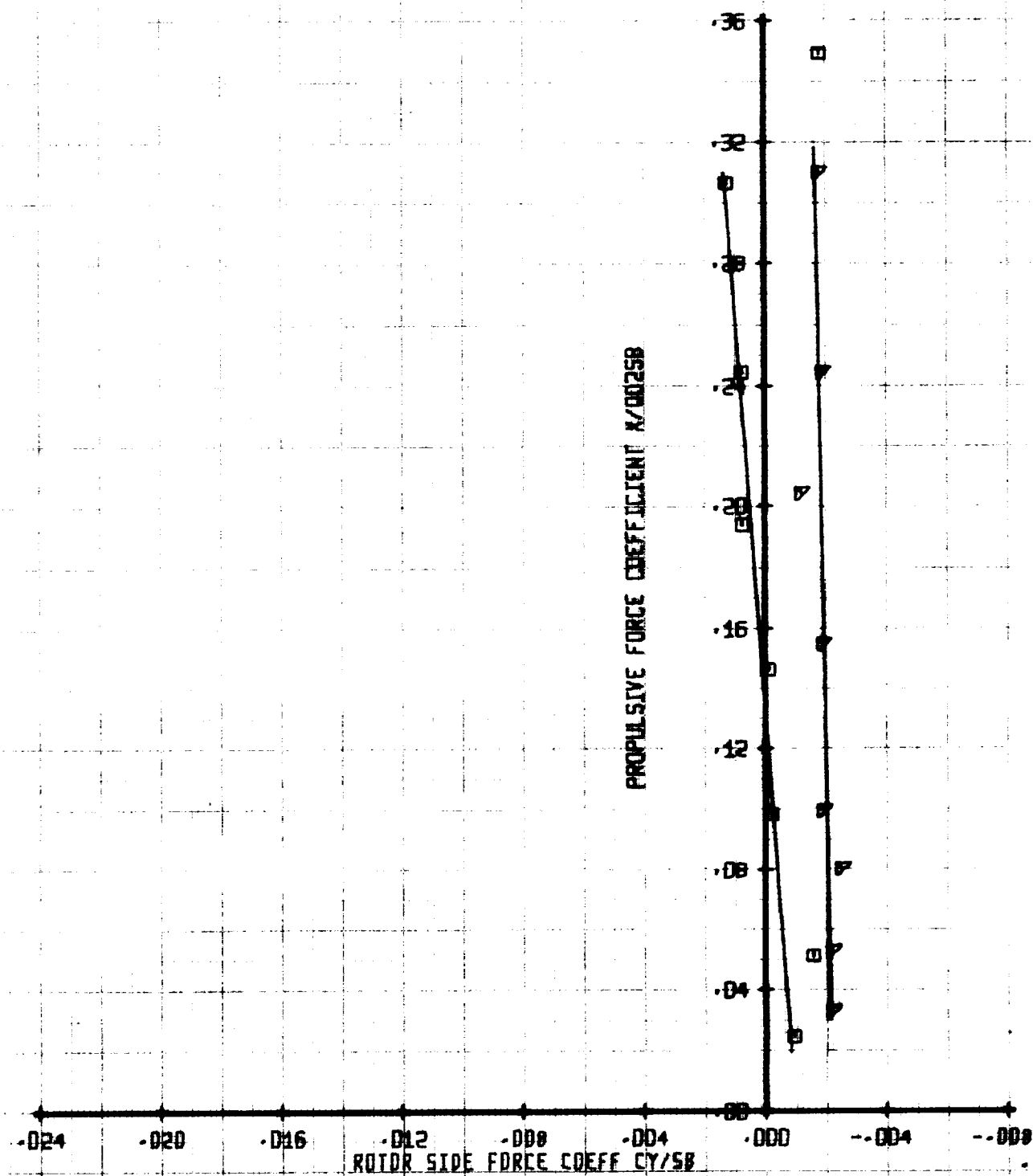


Figure B-56

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

		LEGEND		
SYM	RUN	ML	CT/58	VTUN
□	243	.45	.06	279
△	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR SIDE FORCE COEFFICIENT



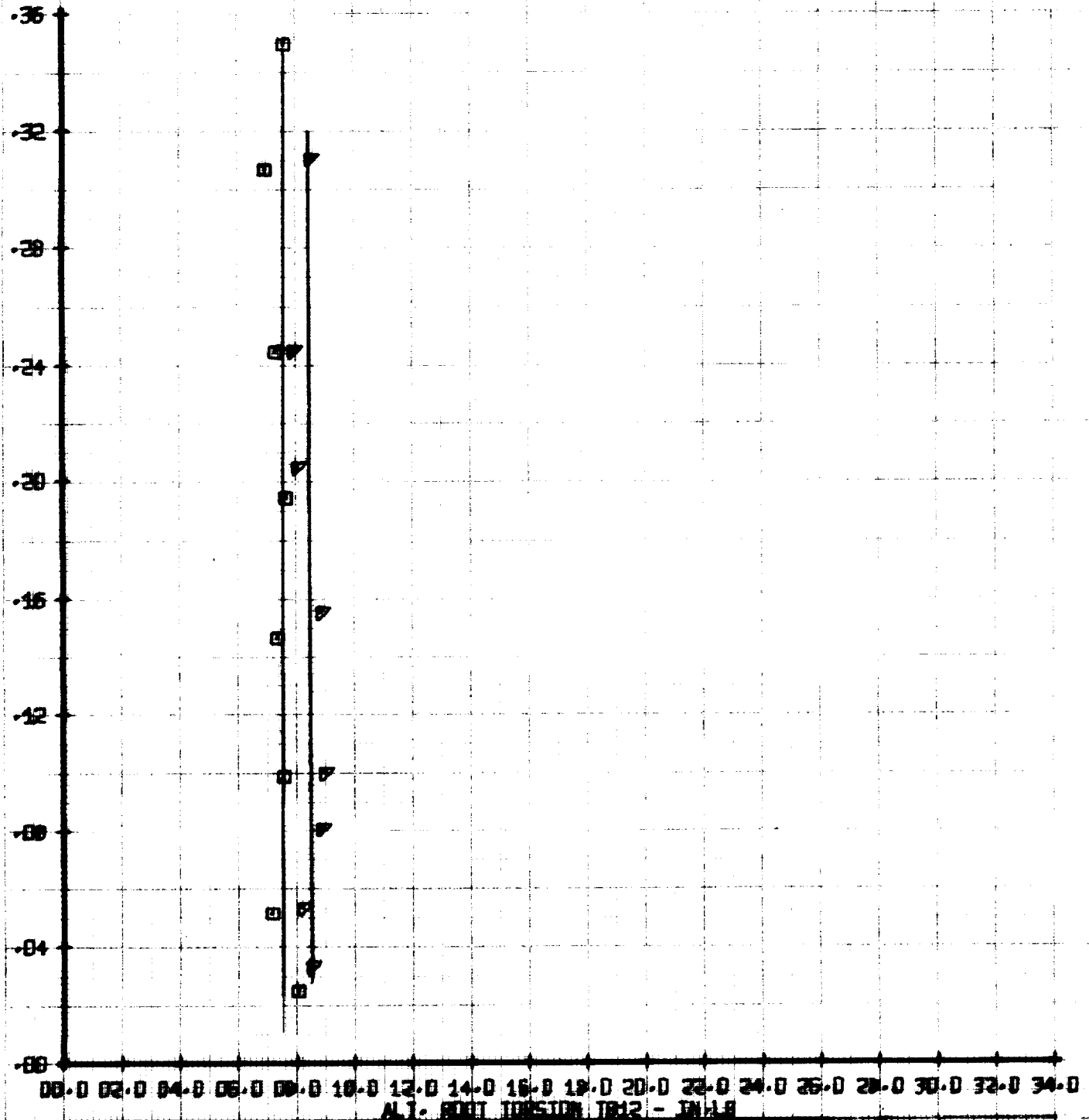
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MLT	CT'58	YTLN
□	243	.45	.06	279
▽	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

PROPULSIVE FORCE COEFFIC IT X/00258



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

		LEGEND			
SYM	RUN	MU	CT/58	VTUM	
□	243	.45	.06	279	
△	244	.45	.076	279	

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING MID SPAN TORSION TB50

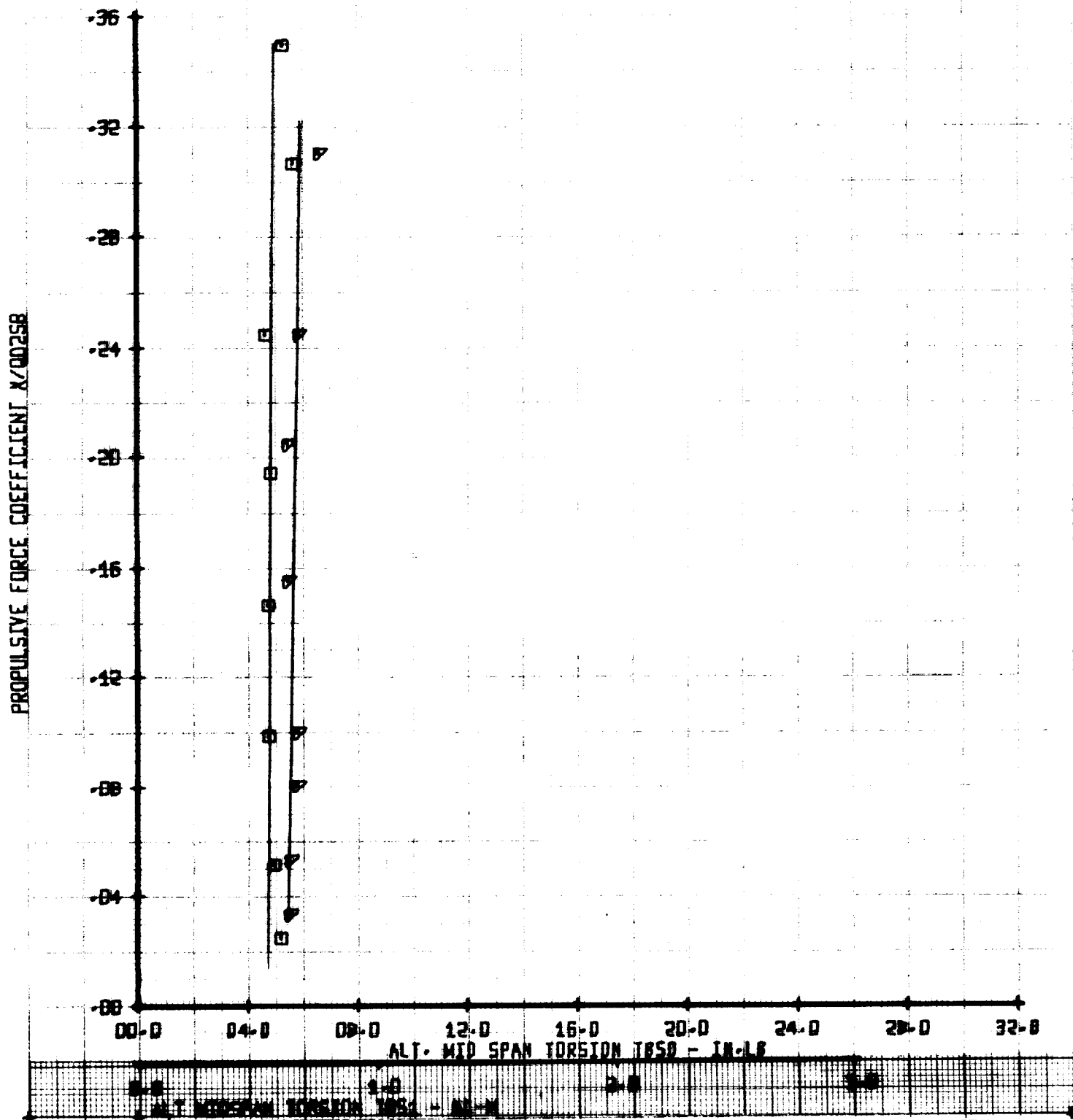


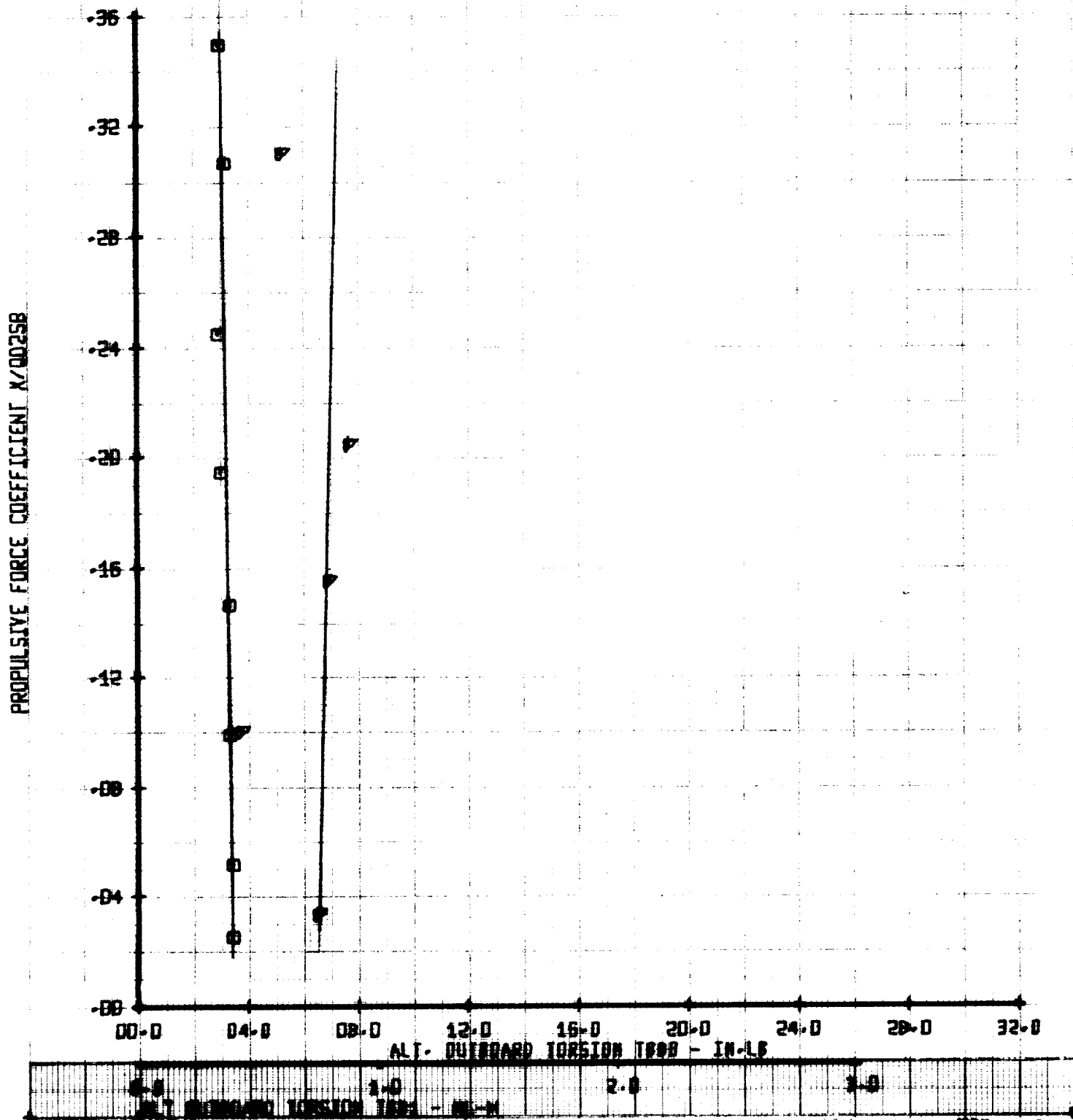
Figure B-59

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/58	VTUN
□	243	.45	.06	279
▽	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB80

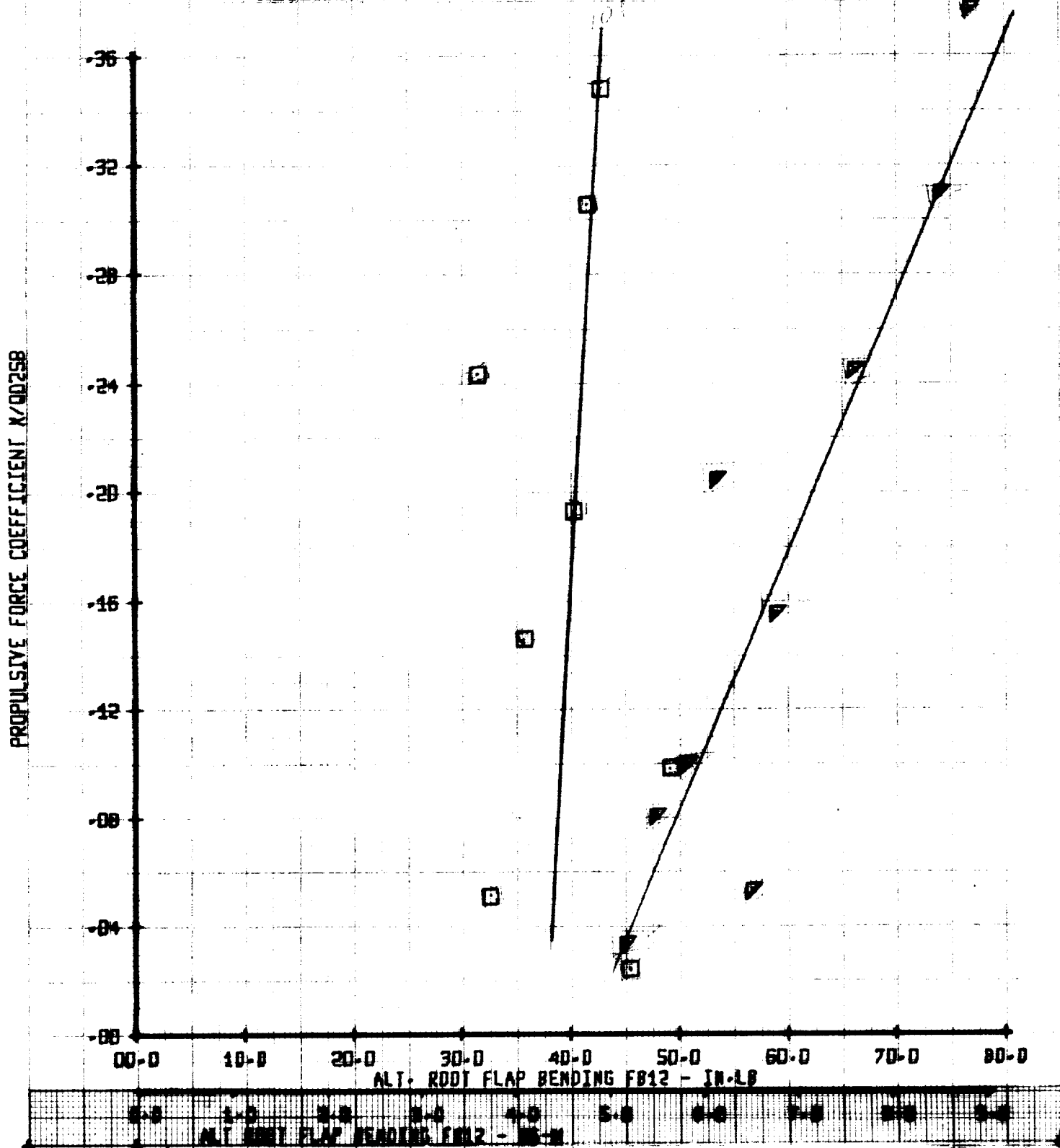


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/SB	VTUN
□	243	.45	.06	279
▽	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

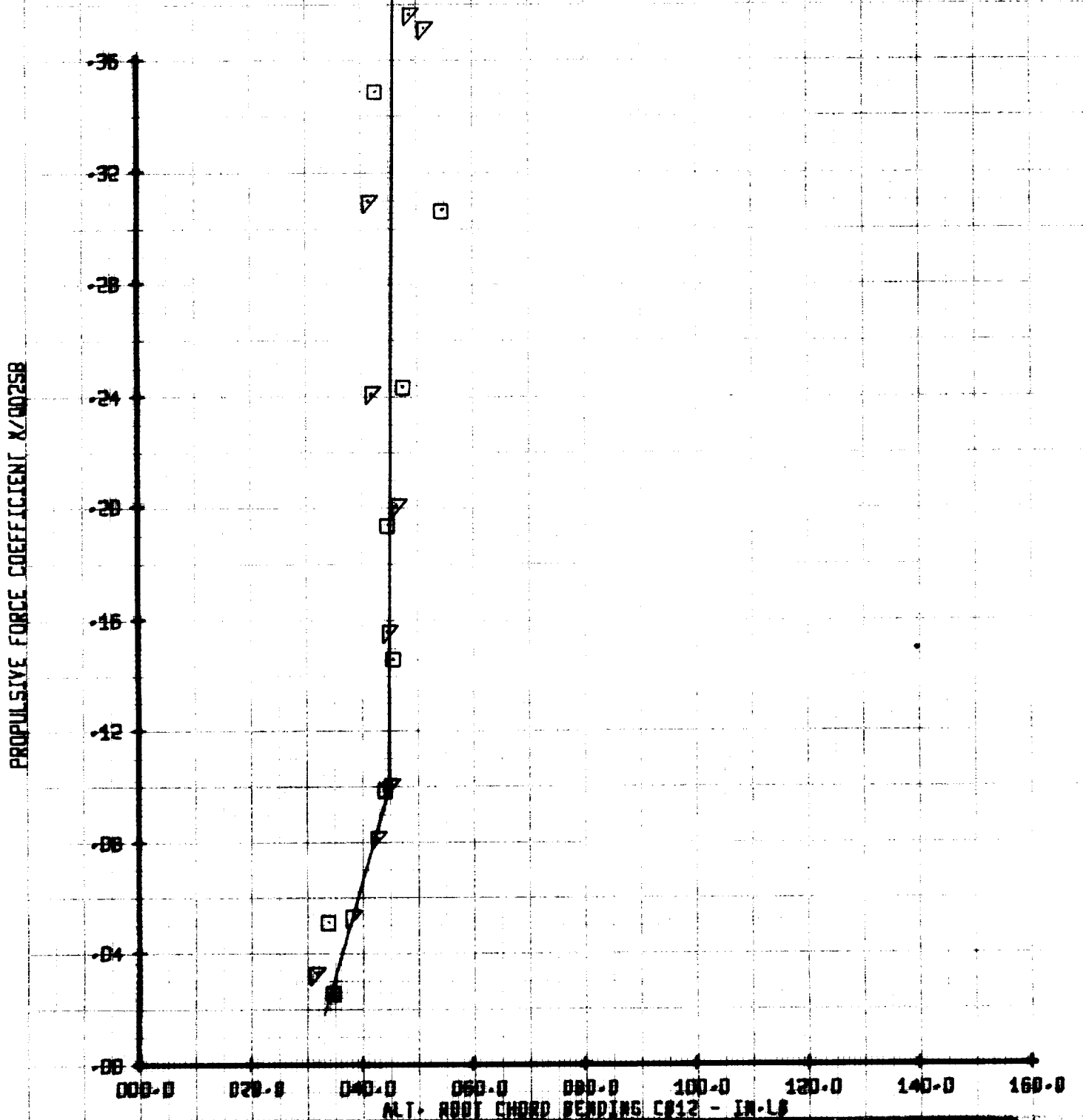


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT' / 58	YTIM
□	243	.45	.06	279
▽	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

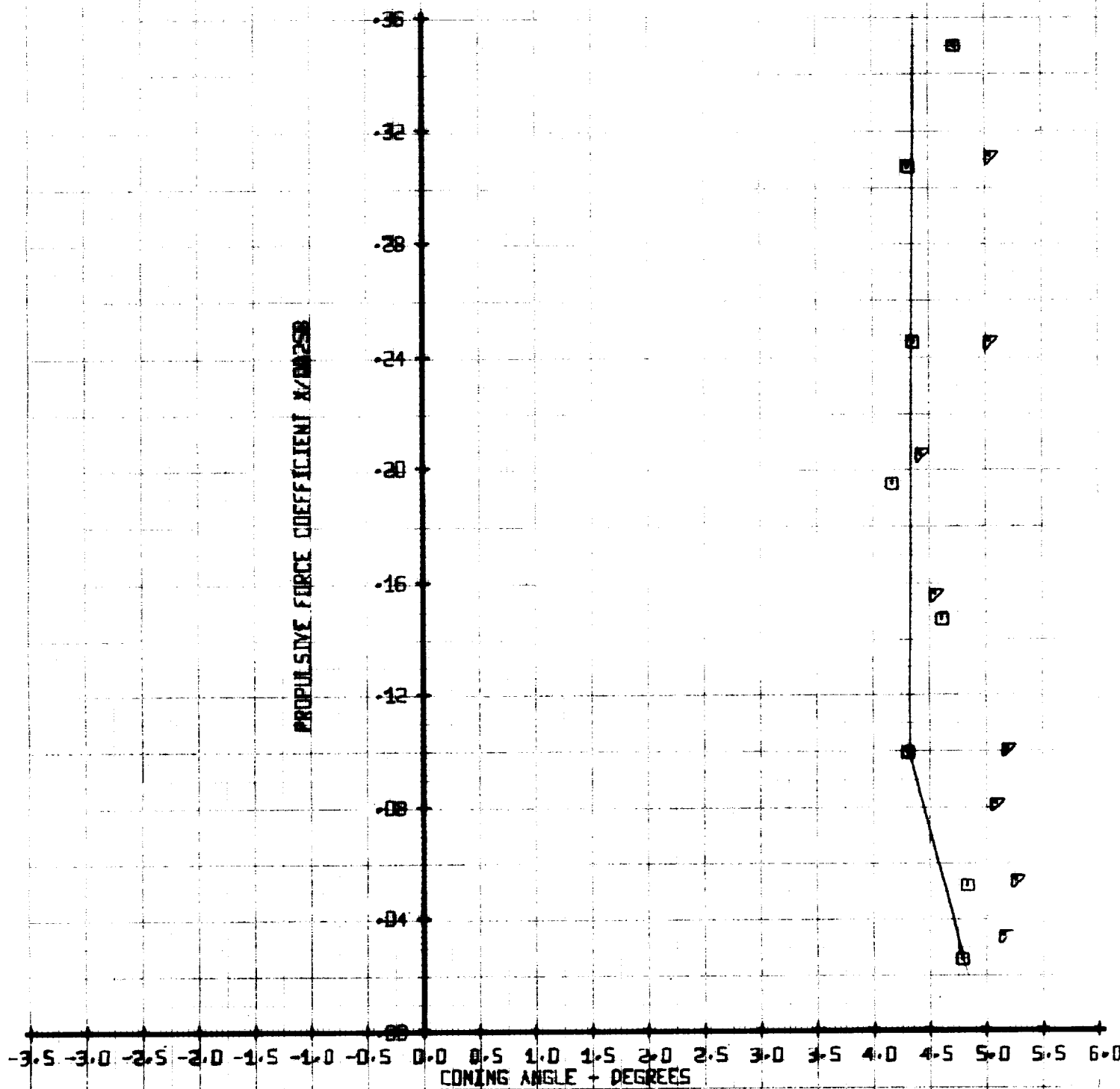


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / 50	Y/DIM
□	243	.45	.06	279
▽	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 CONING ANGLE

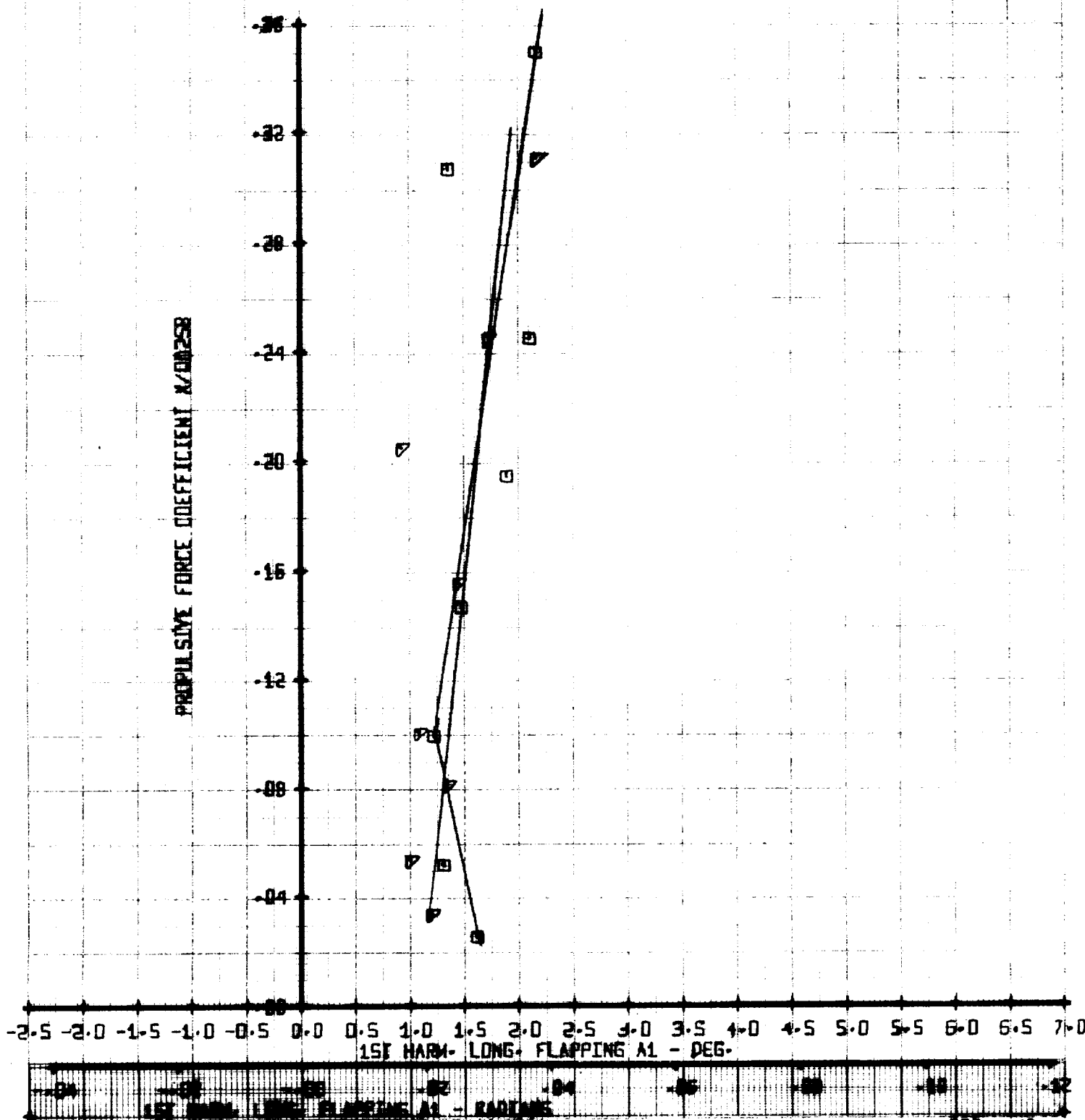


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	BLIN	MU'	CT'/58	VTUM
□	243	.45	.06	279
▽	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1

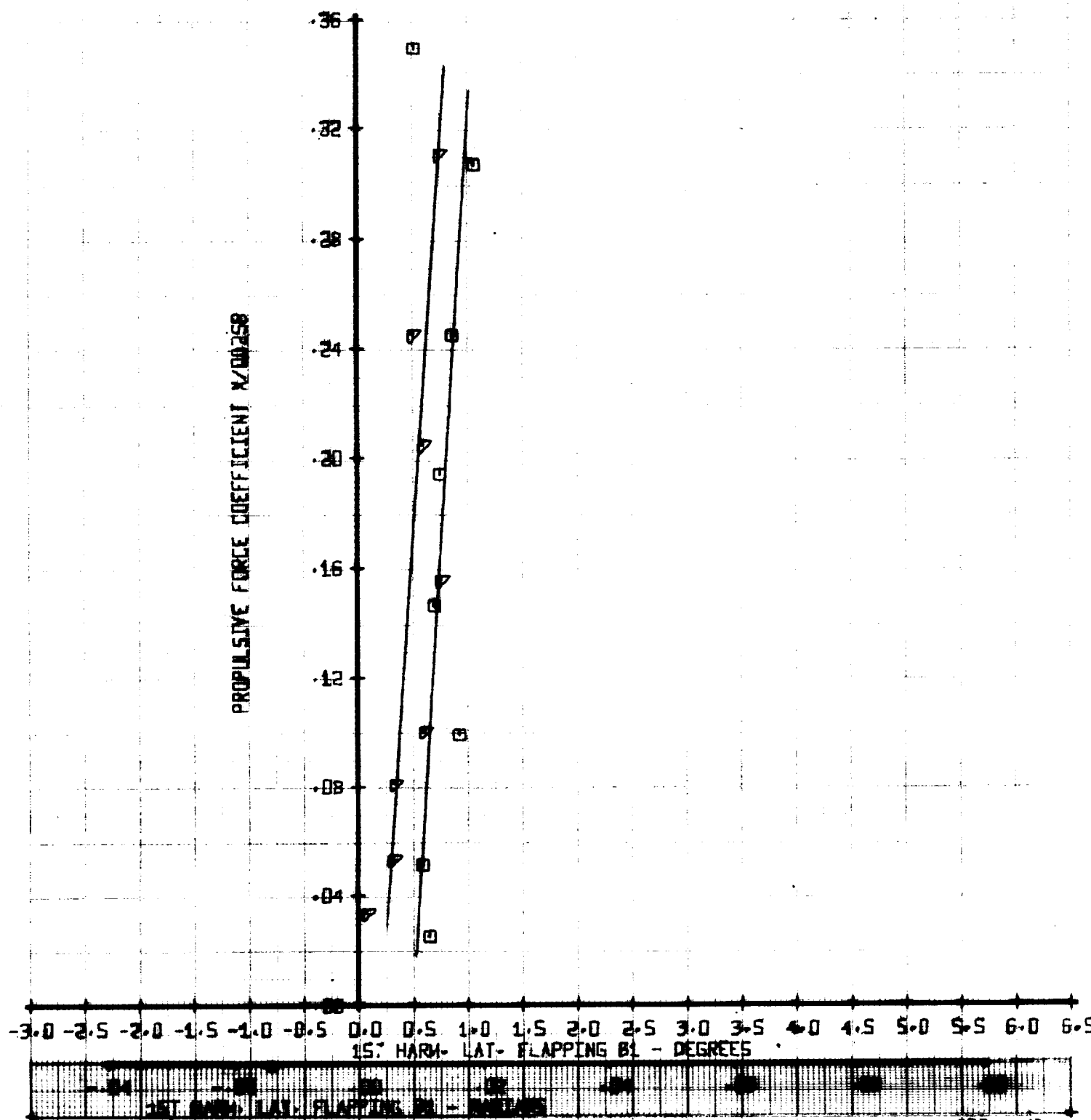


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	YIELD
□	243	.45	.06	279
▽	244	.45	.075	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

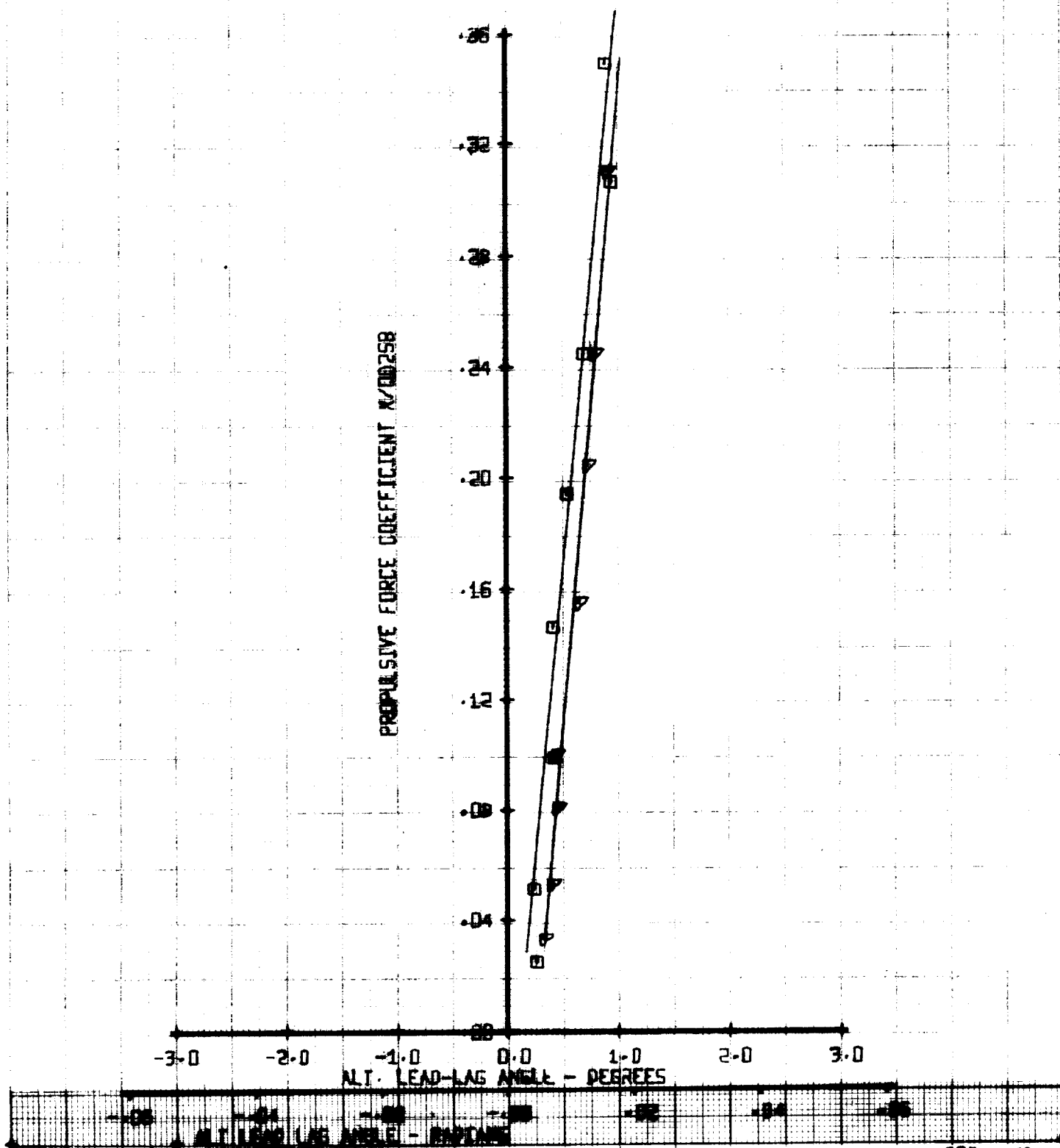


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-17B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/50	YTDN
0	243	.45	.06	279
7	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING LEAD-LAG ANGLE



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-17B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	YTUN
0	243	-45	.06	279
7	244	-45	.076	279

ROTOR PITCHING MOMENT COEFFICIENT
 VERSUS
 1ST HARMONIC LONGITUDINAL FLAPPING A1

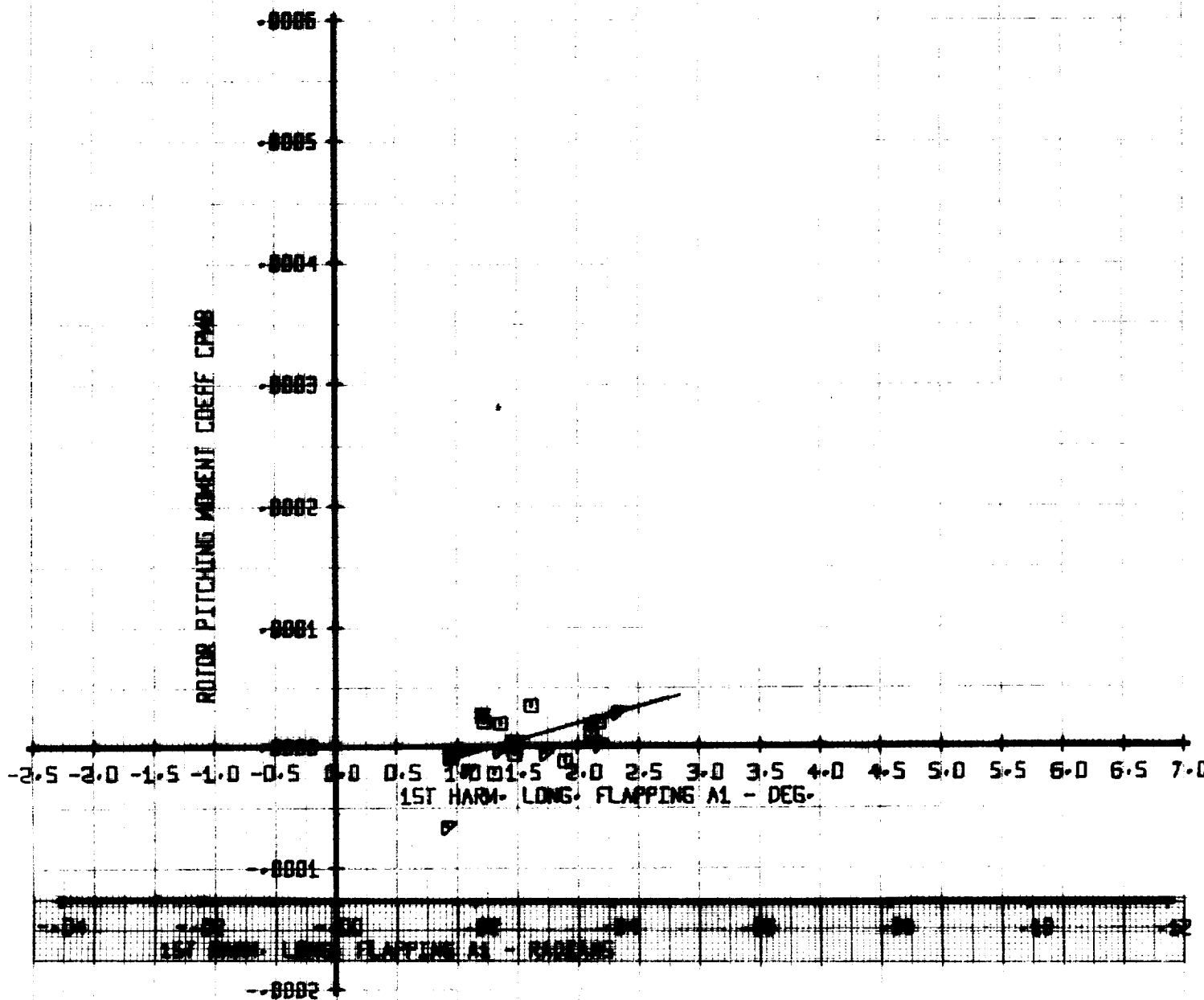


Figure B-67

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / 58	YOUN
□	243	.45	.06	279
○	244	.45	.076	279

ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

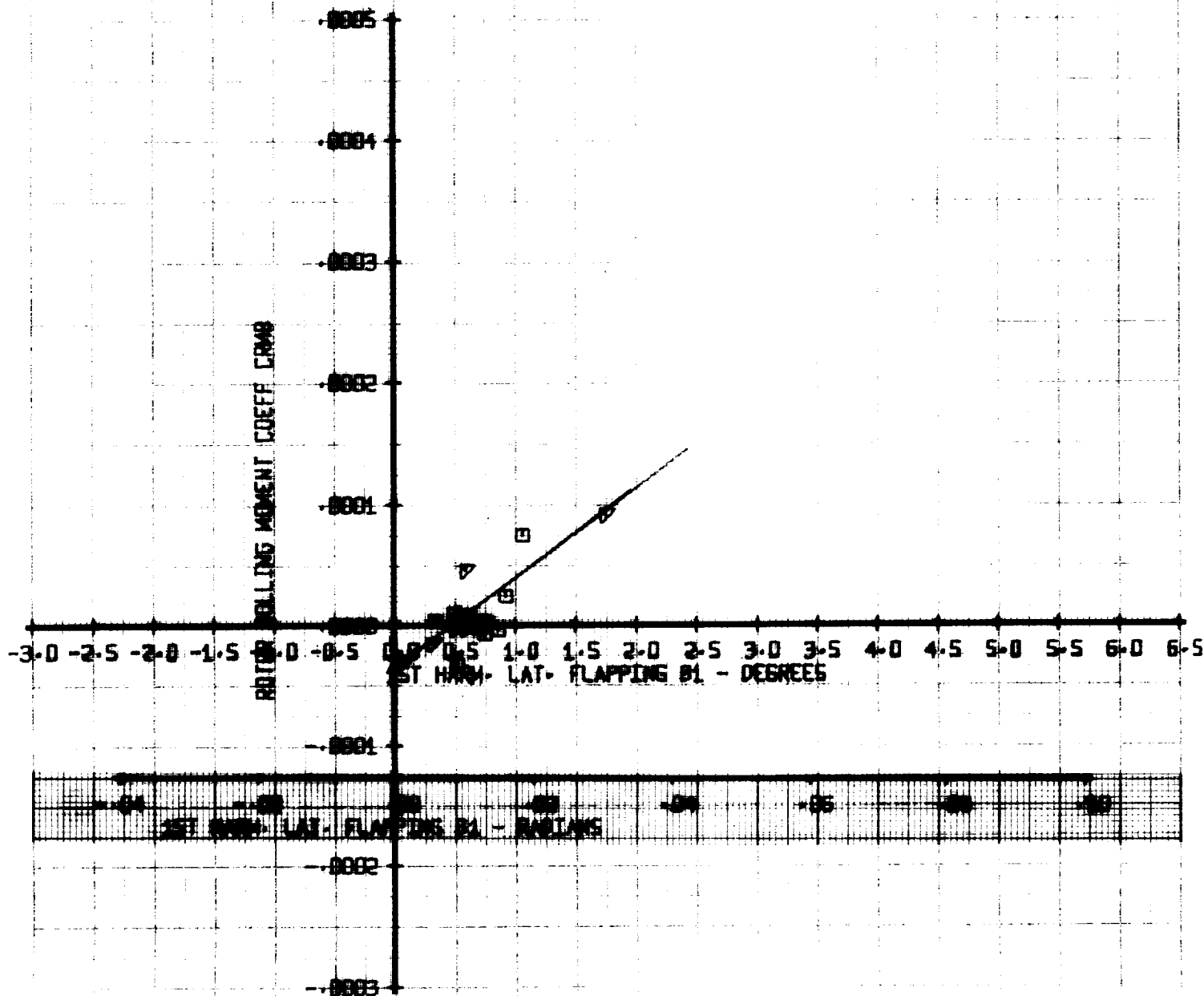


Figure B-68

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

		LEGEND			
SYM	RUN	MU'	CT'/58	YTUN	
□	243	.45	.06	279	
■	244	.45	.076	279	

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR PROPULSIVE FORCE COEFFICIENT

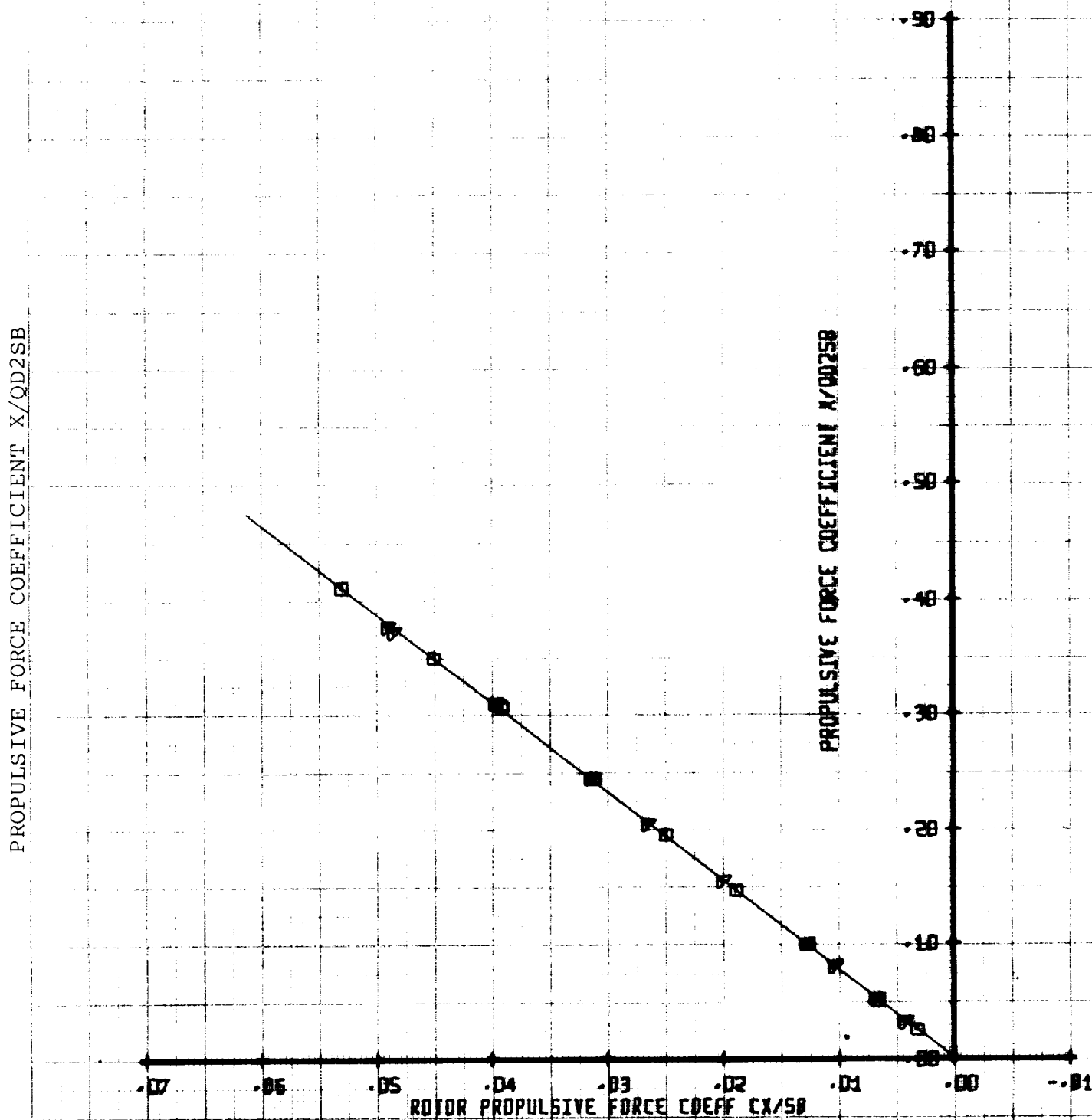


Figure B-69

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RLIN	MLI	CTI/58	VTUN
□	243	.45	.06	279
△	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK

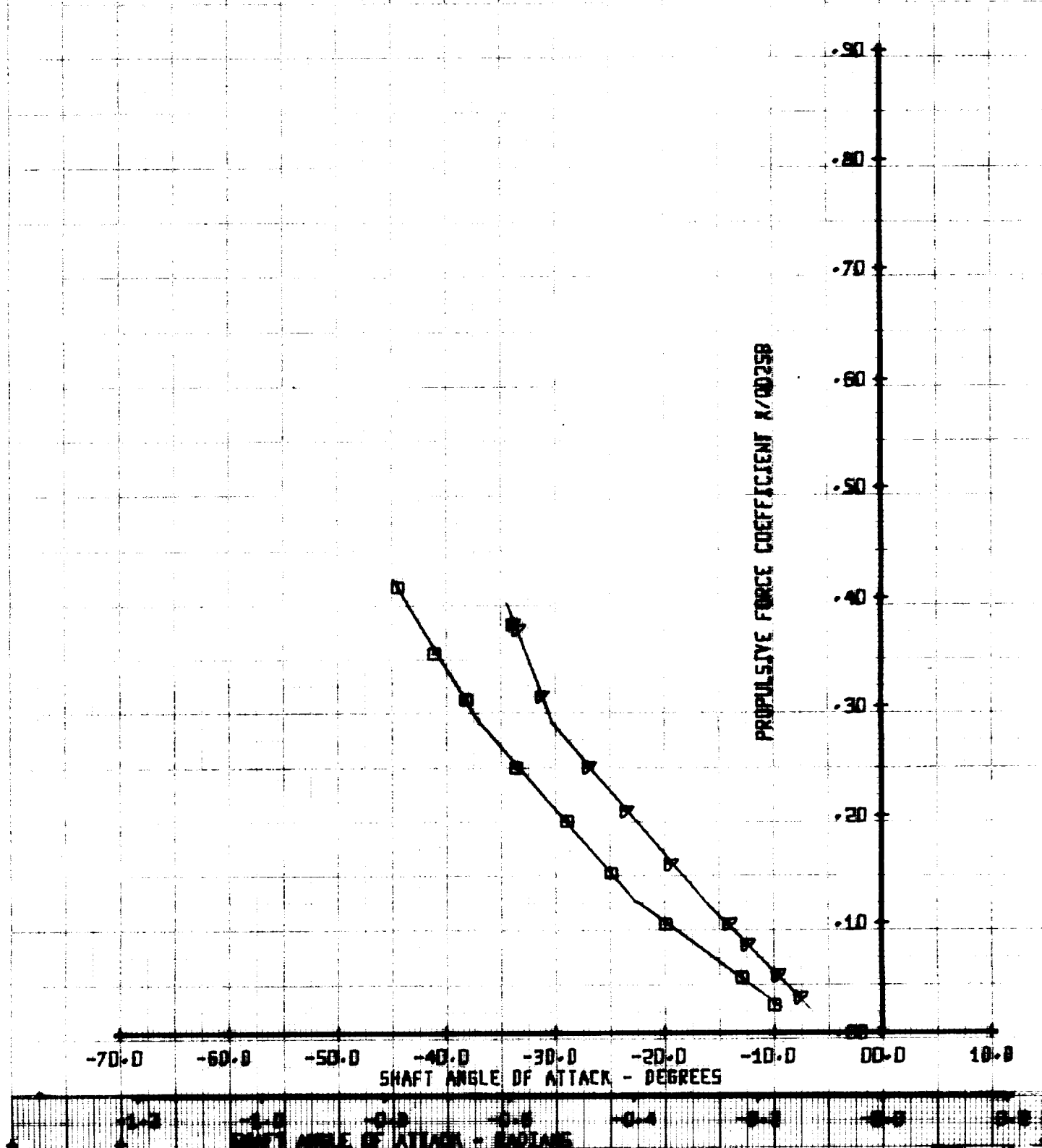


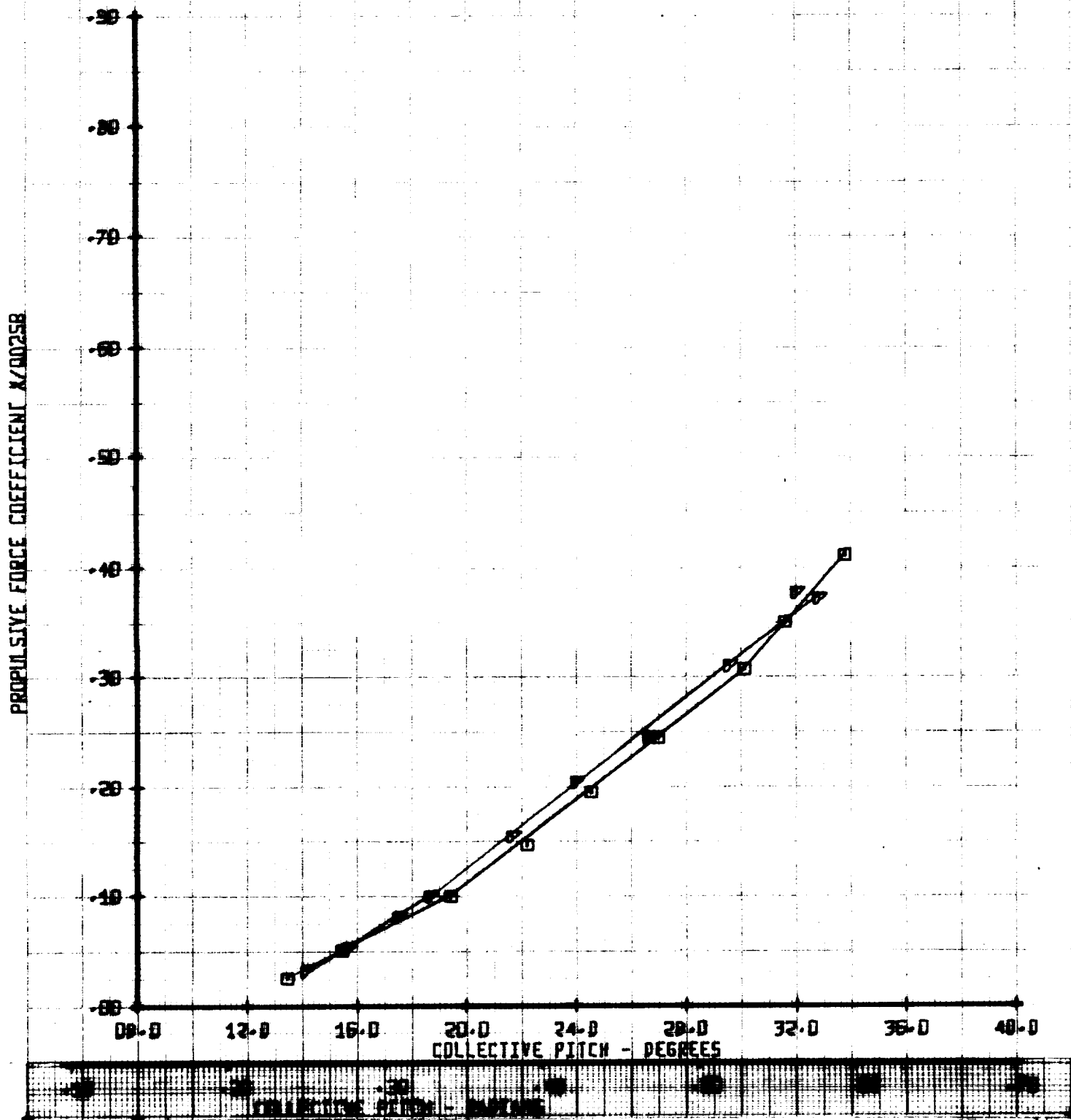
Figure B-70

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT'258	YTLN
□	243	.45	.06	279
■	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
COLLECTIVE PITCH



B-74

SET 48
BVWT 193

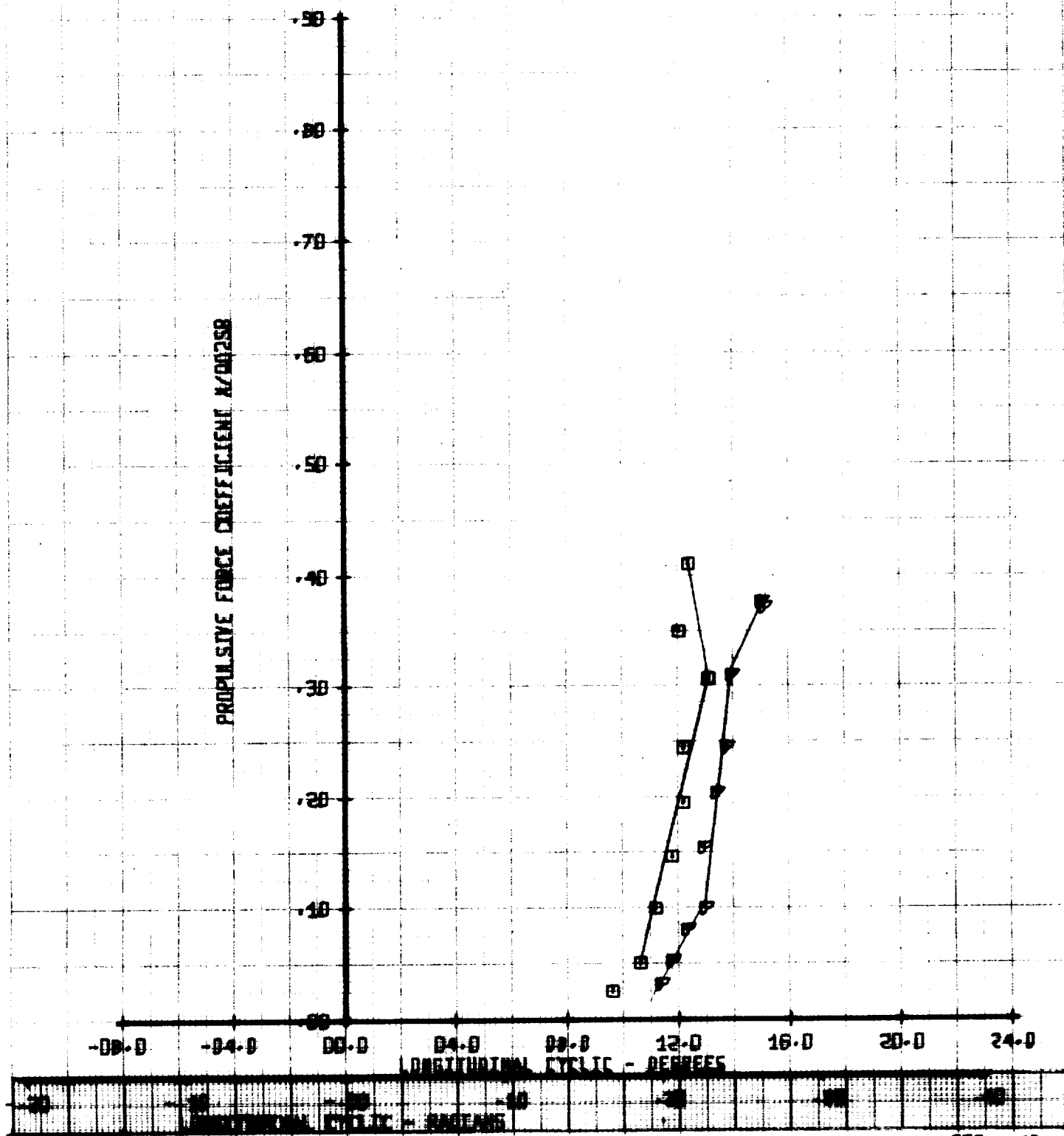
ET 48
WT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	MIN	MI'	CT'/SB	VTUN
□	243	.45	.06	279
●	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LONGITUDINAL CYCLIC



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND		CL' / 258	VTUN
SYM	RUN		
□	243	.45	279
△	244	.45	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LATERAL CYCLIC

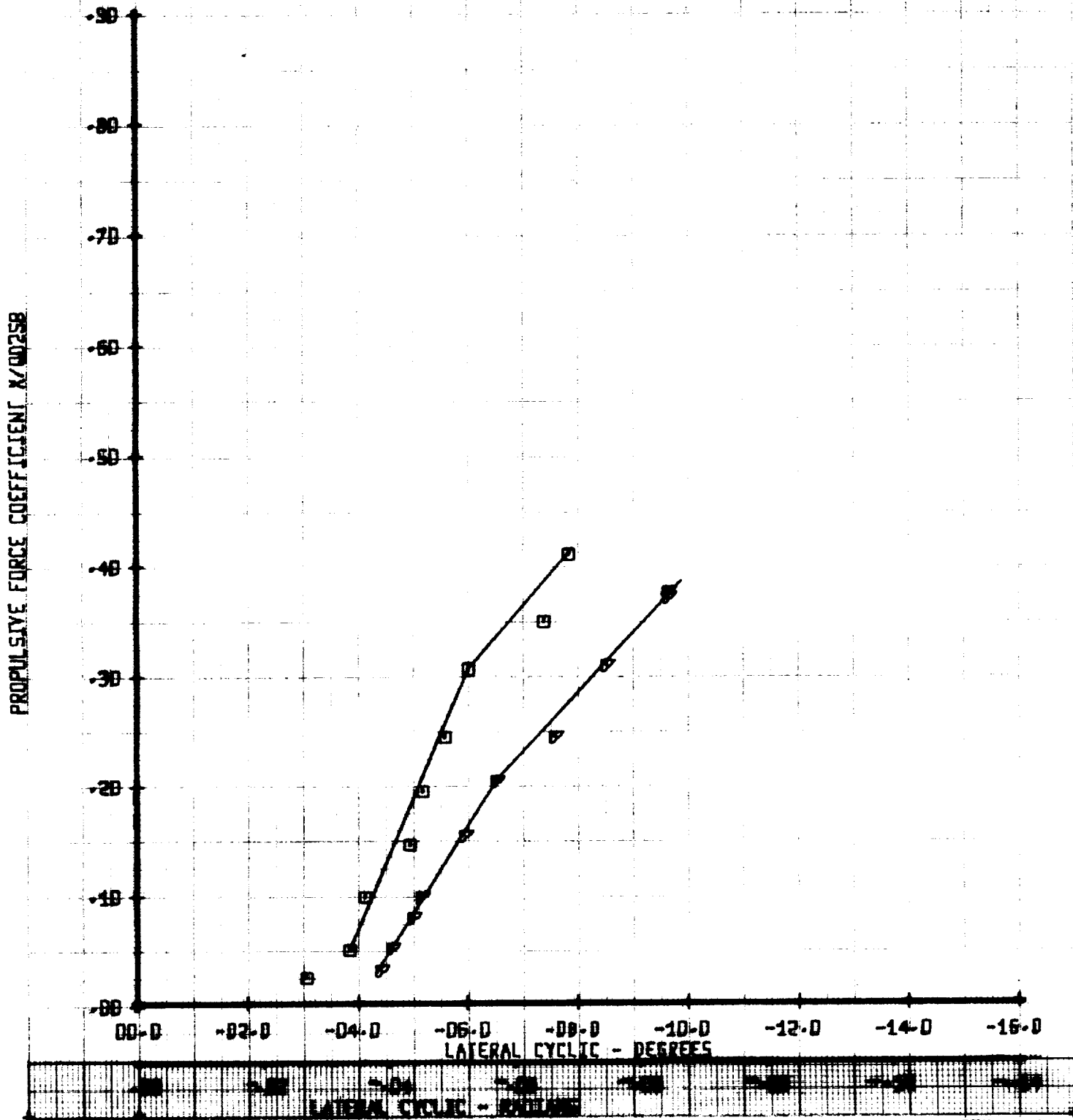


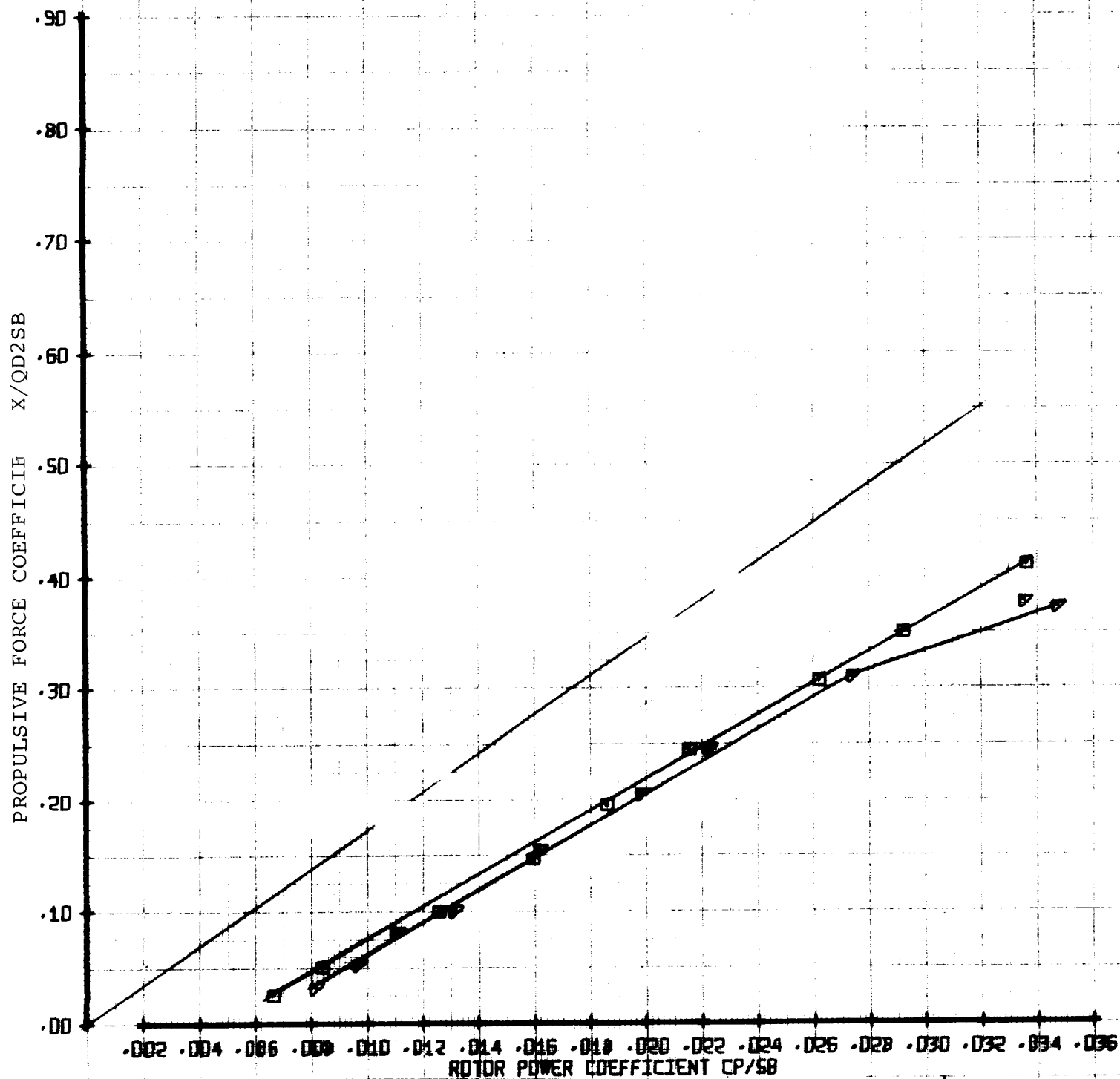
Figure B-73

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT' / SB	YTLN
□	243	.45	.06	279
▽	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR POWER COEFFICIENT

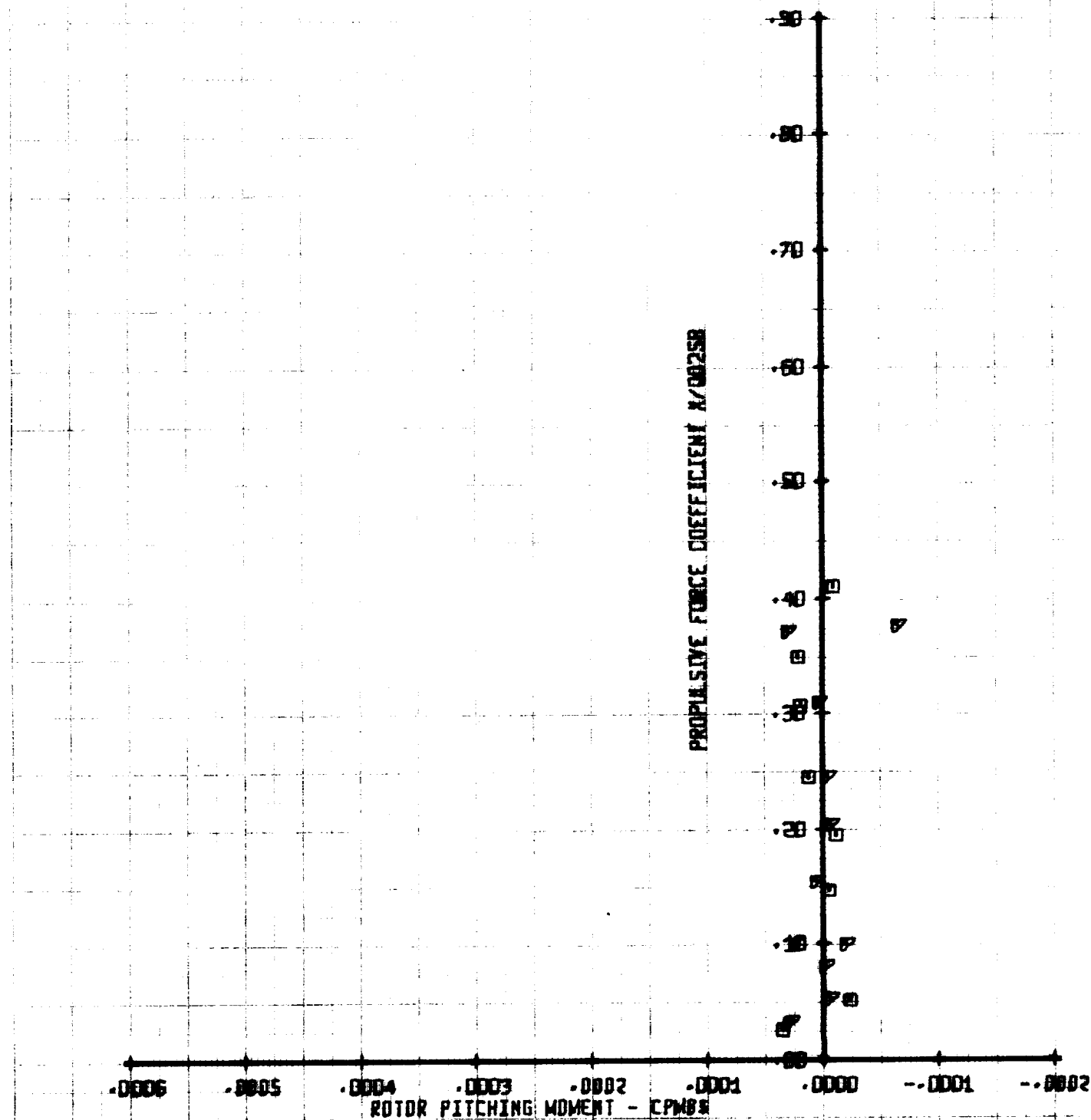


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	YTLN
□	243	.45	.06	279
▽	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PITCHING MOMENT

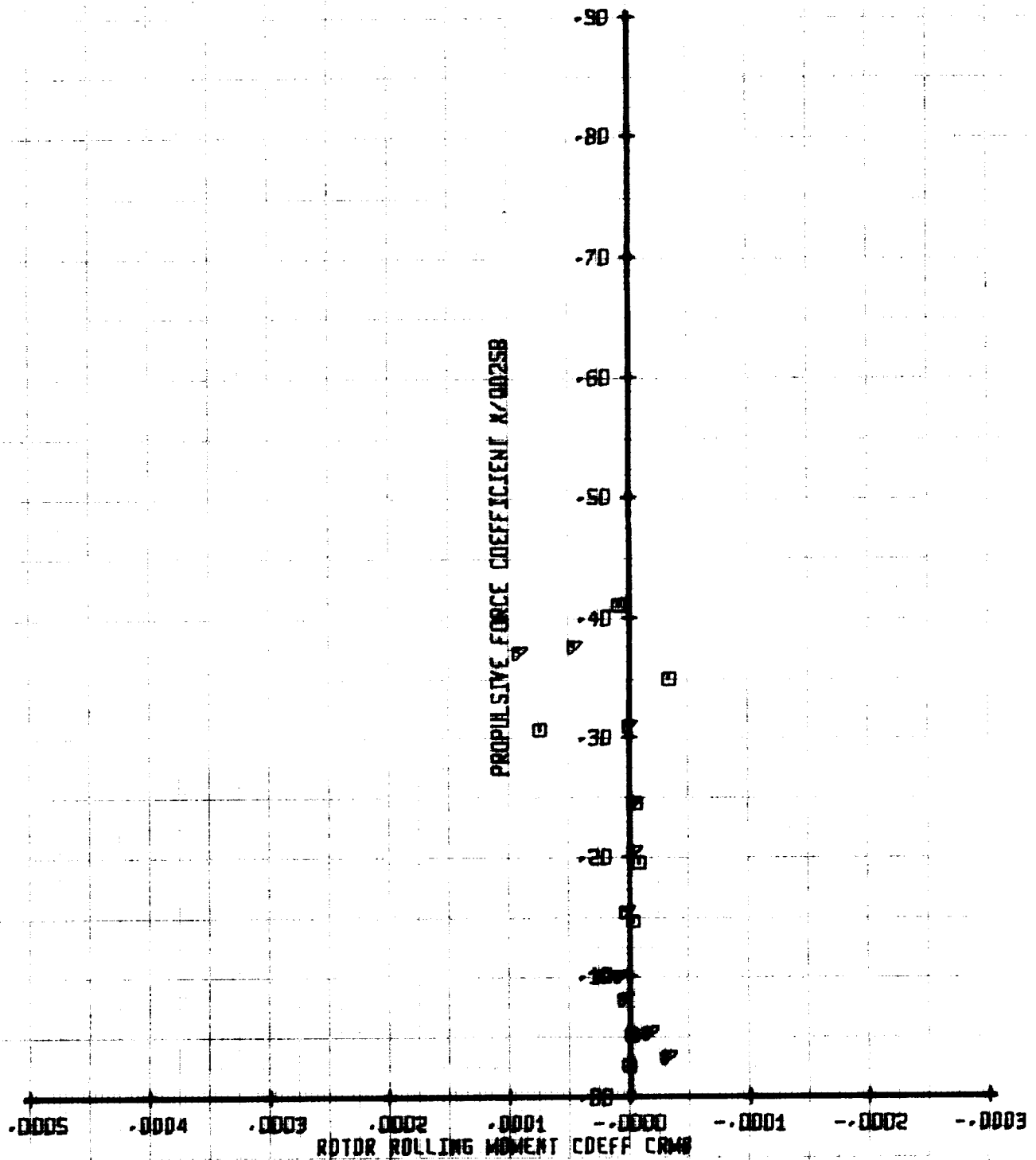


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI	CT/VSB	VRUN
□	243	.45	.06	279
△	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR ROLLING MOMENT COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT' / 58	VTLM
□	243	.45	.06	279
△	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR LONGITUDINAL FORCE COEFFICIENT

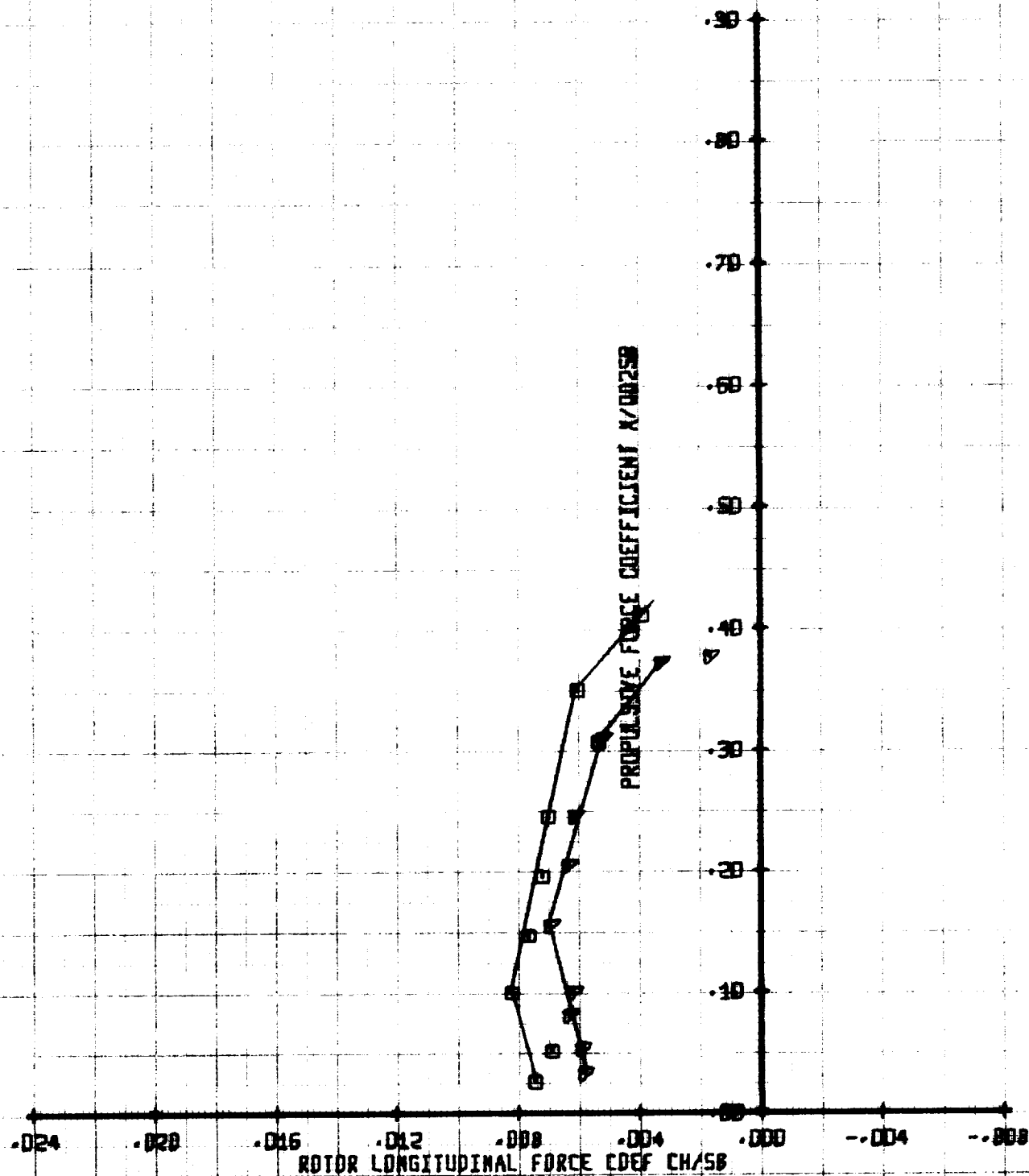


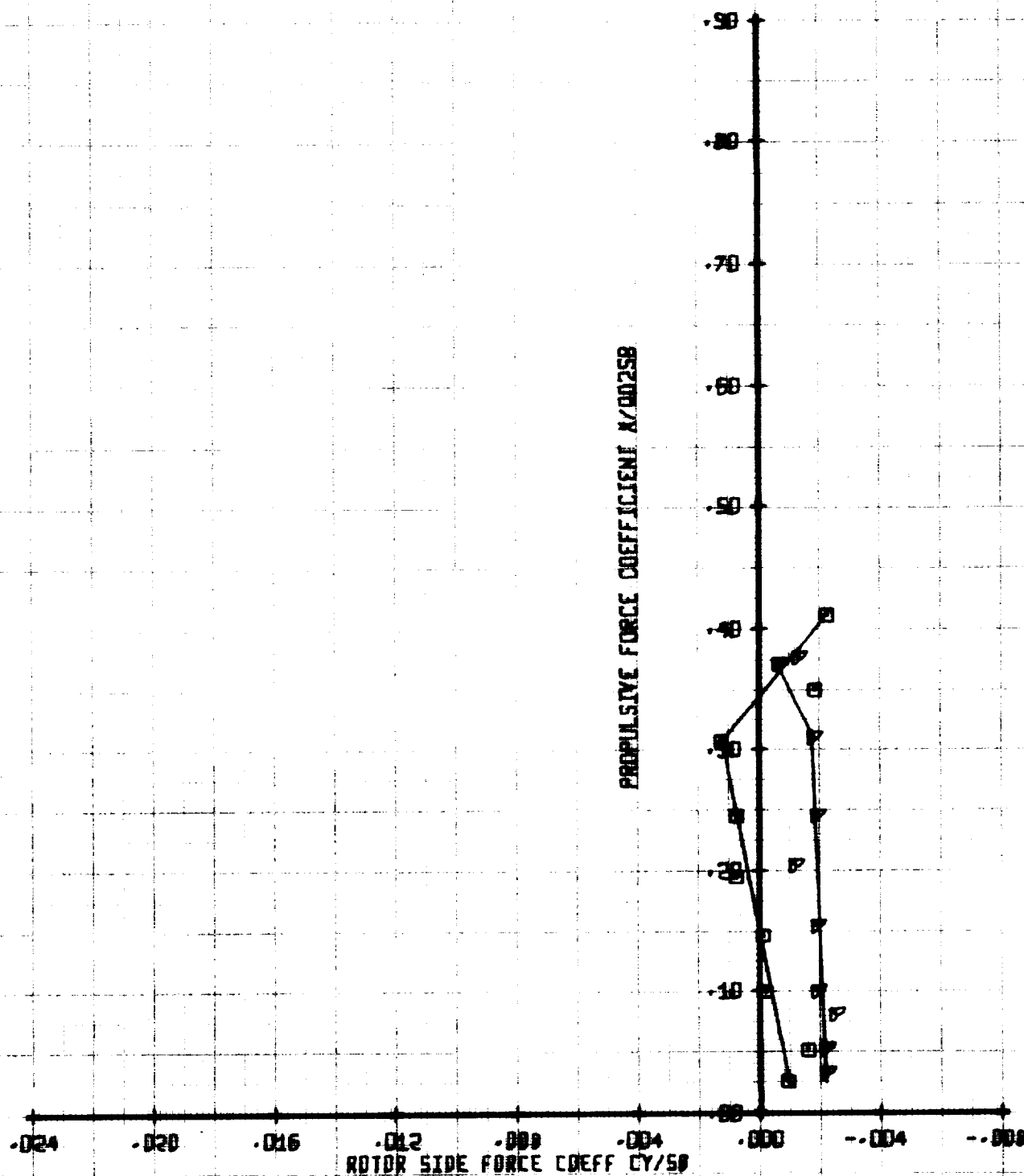
Figure B-77

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-470 ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT'/58	YTDIN
□	243	.45	.06	279
△	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR SIDE FORCE COEFFICIENT



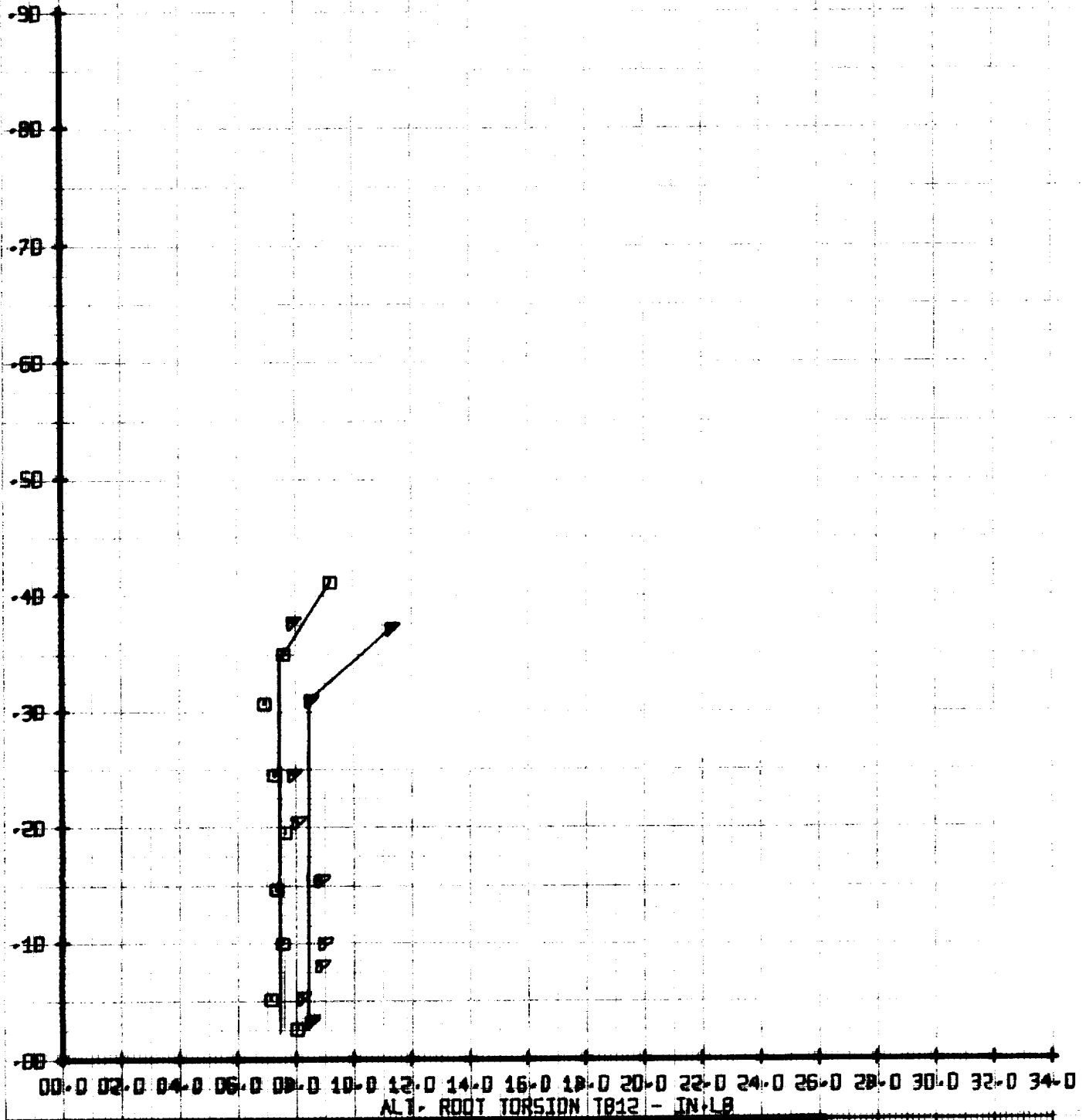
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MJ'	CT'Y58	VTUM
□	243	.45	.06	279
△	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

PROPULSIVE FORCE COEFFIC JT X/00258

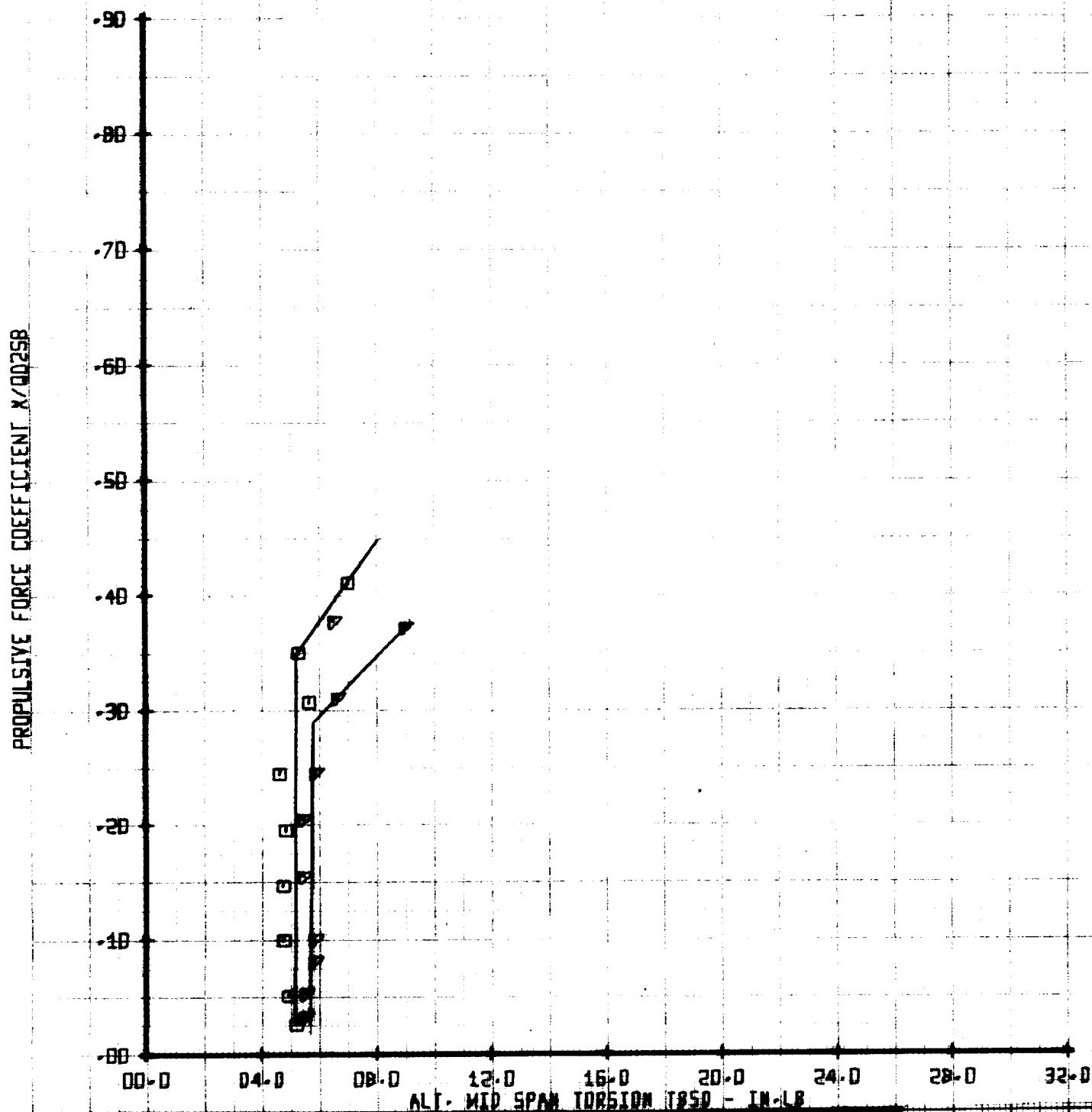


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT' / SB	VTUN
□	243	.45	.06	279
▽	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50

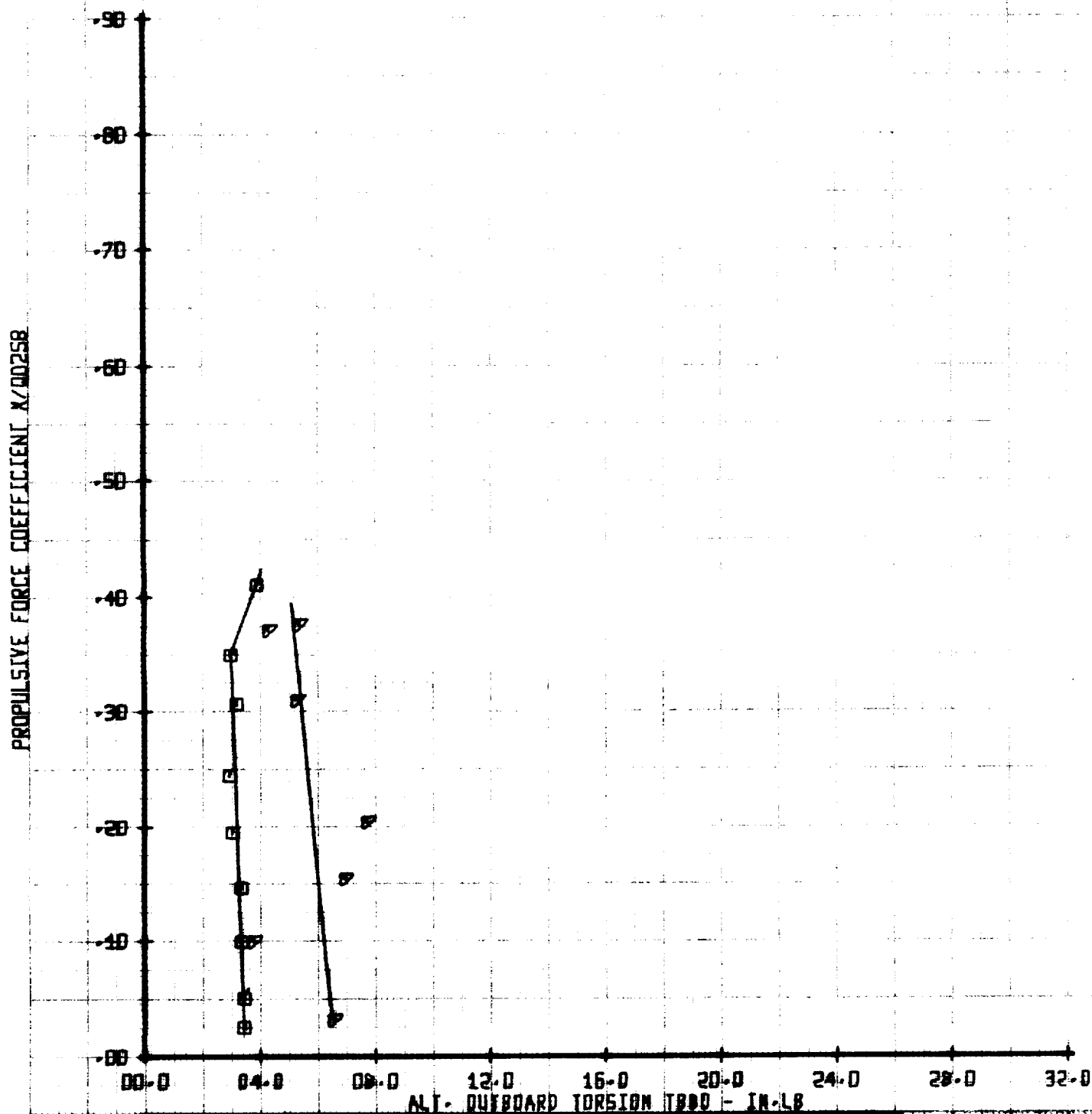


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT' / 58	VTUN
□	243	.45	.06	279
▽	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB80

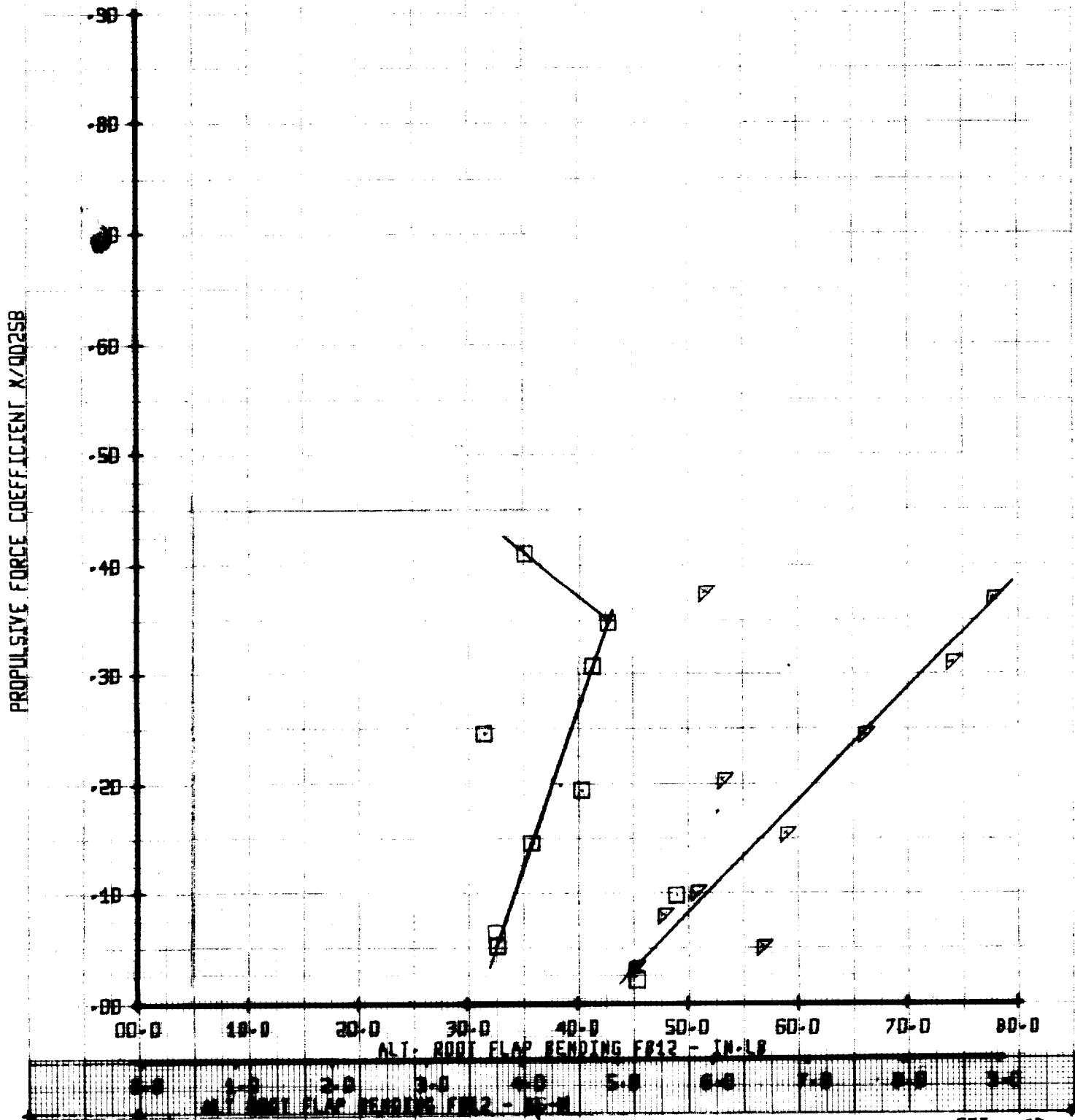


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT' / SB	VTUN
□	243	.45	.06	279
◇	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

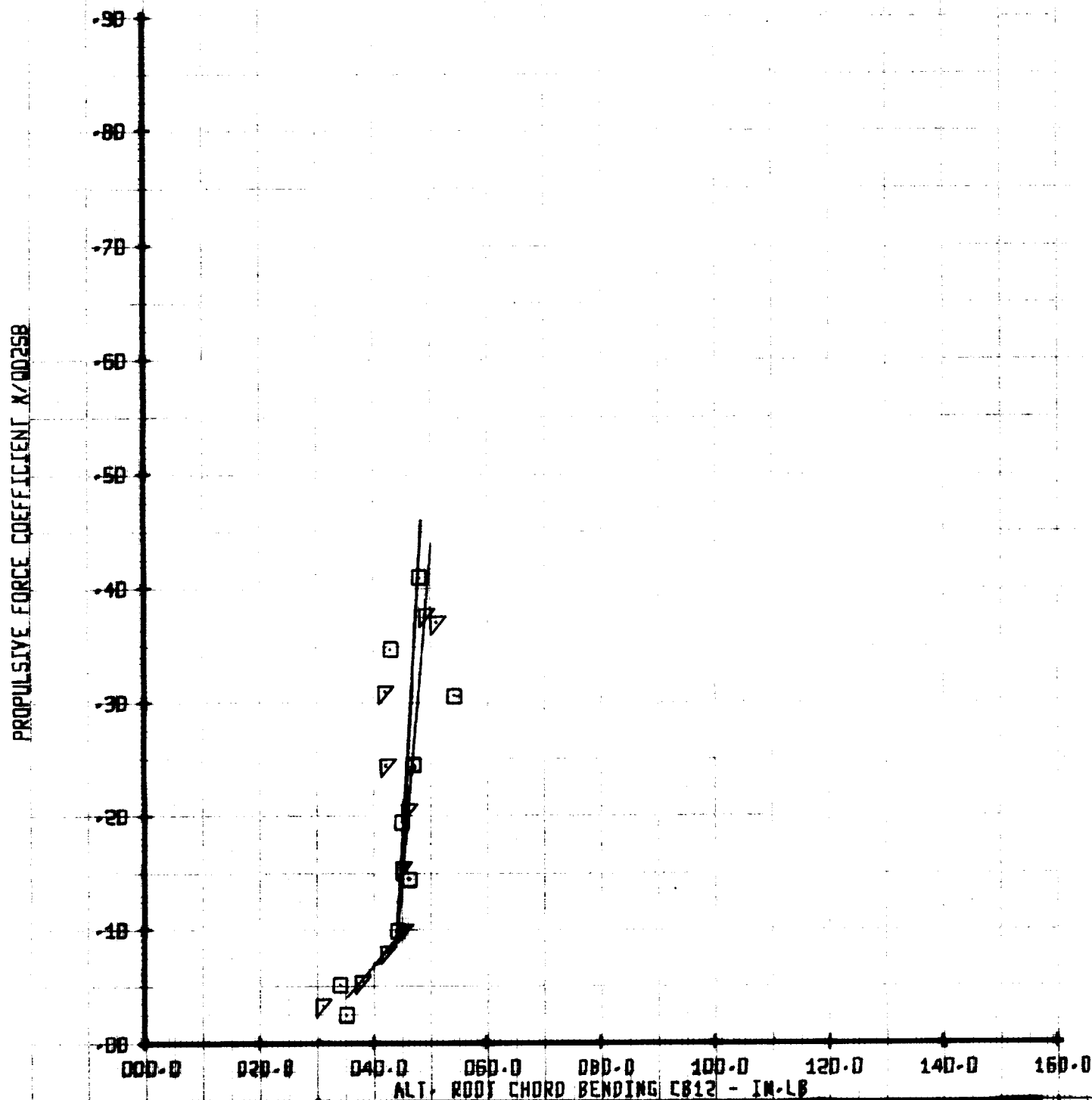


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT' / 58	VTUN
□	243	.45	.06	279
▽	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

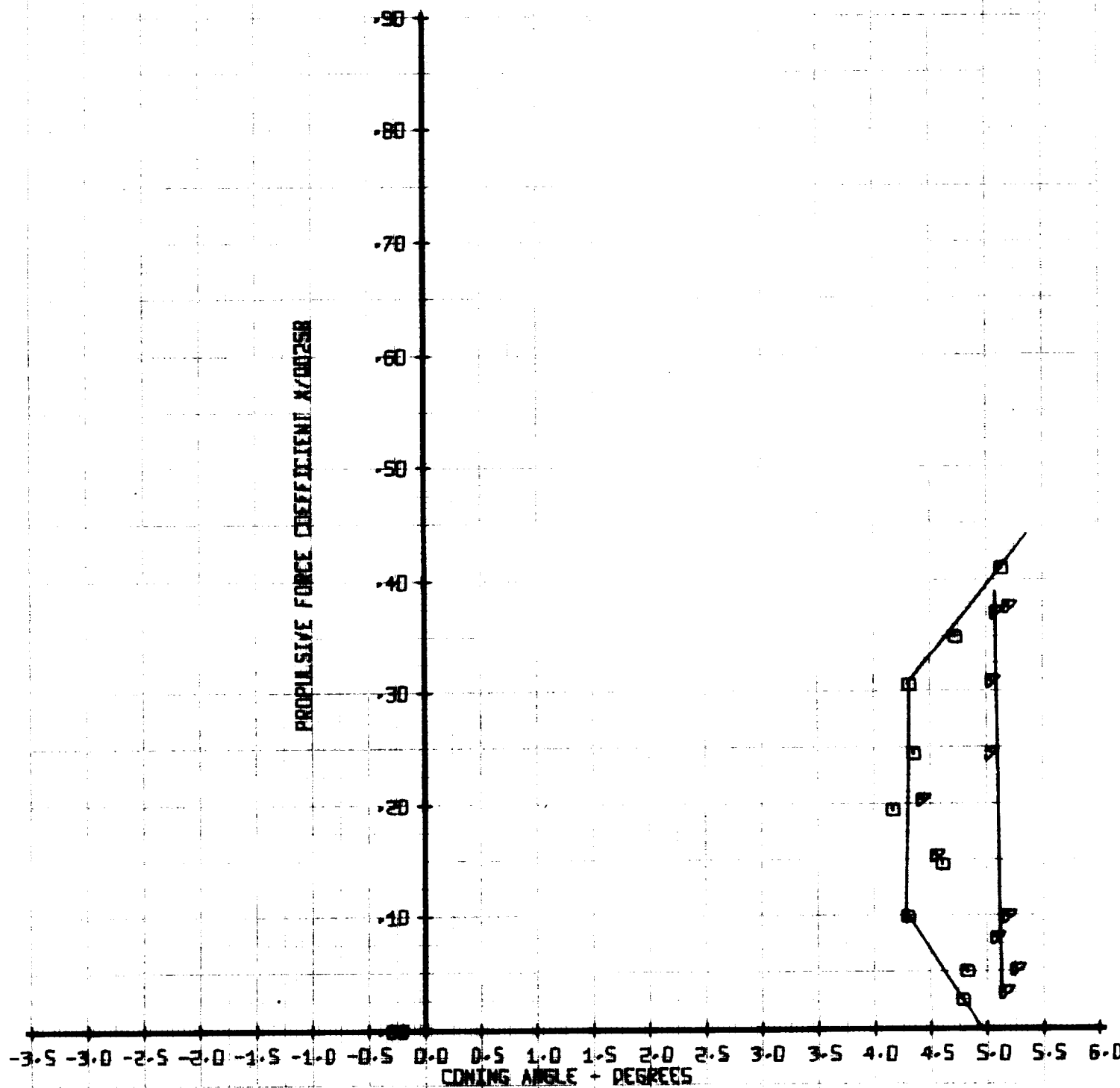


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / SB	YTUN
□	243	.45	.06	279
△	244	.45	.076	279

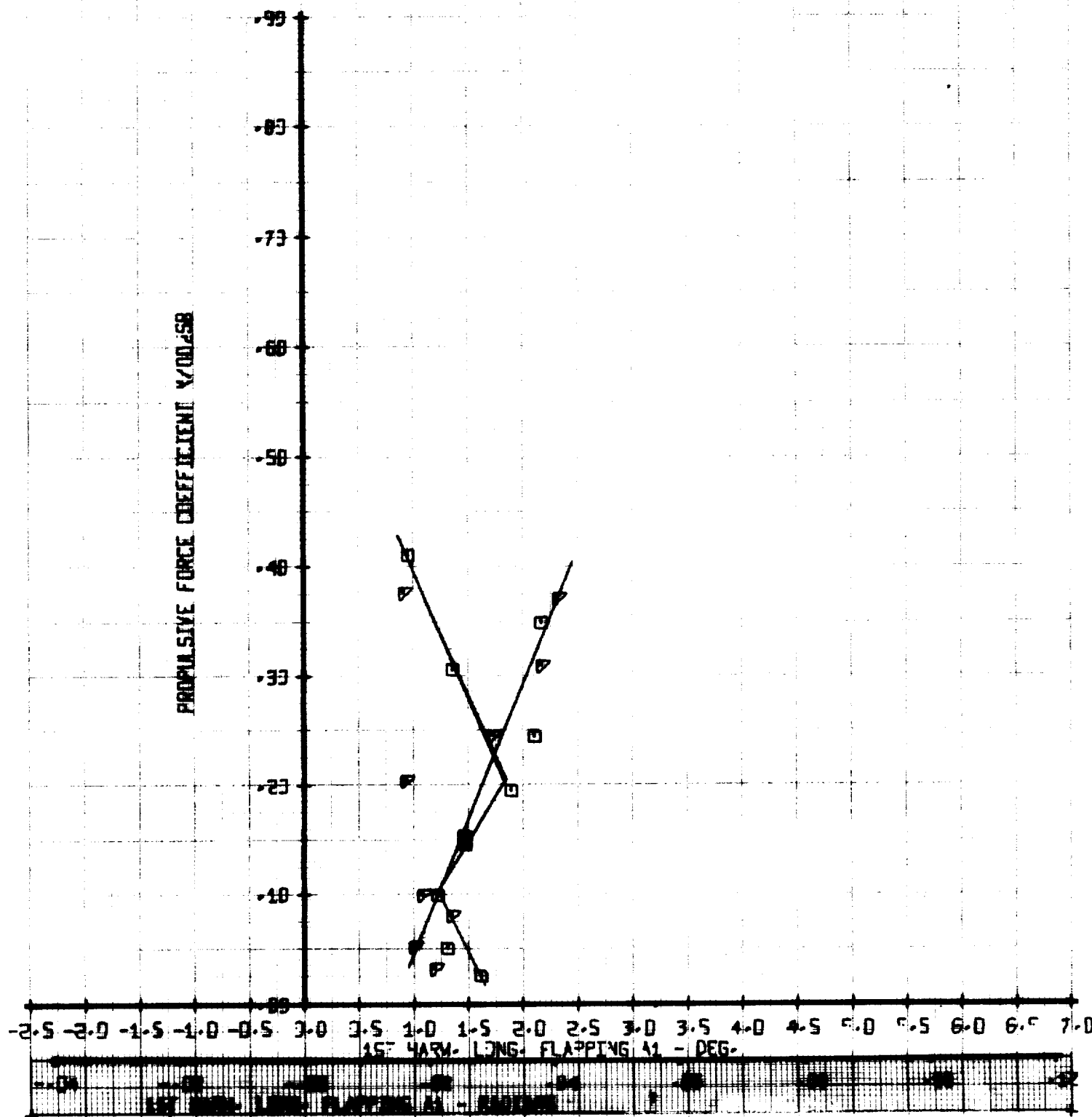
PROPULSIVE FORCE COEFFICIENT
 VERSUS
 CONING ANGLE



LEFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MU'	L ² /58	YTUN
G	243	.45	.06	279
A	214	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 1ST HARMONIC LONGITUDINAL FLAPPING A1

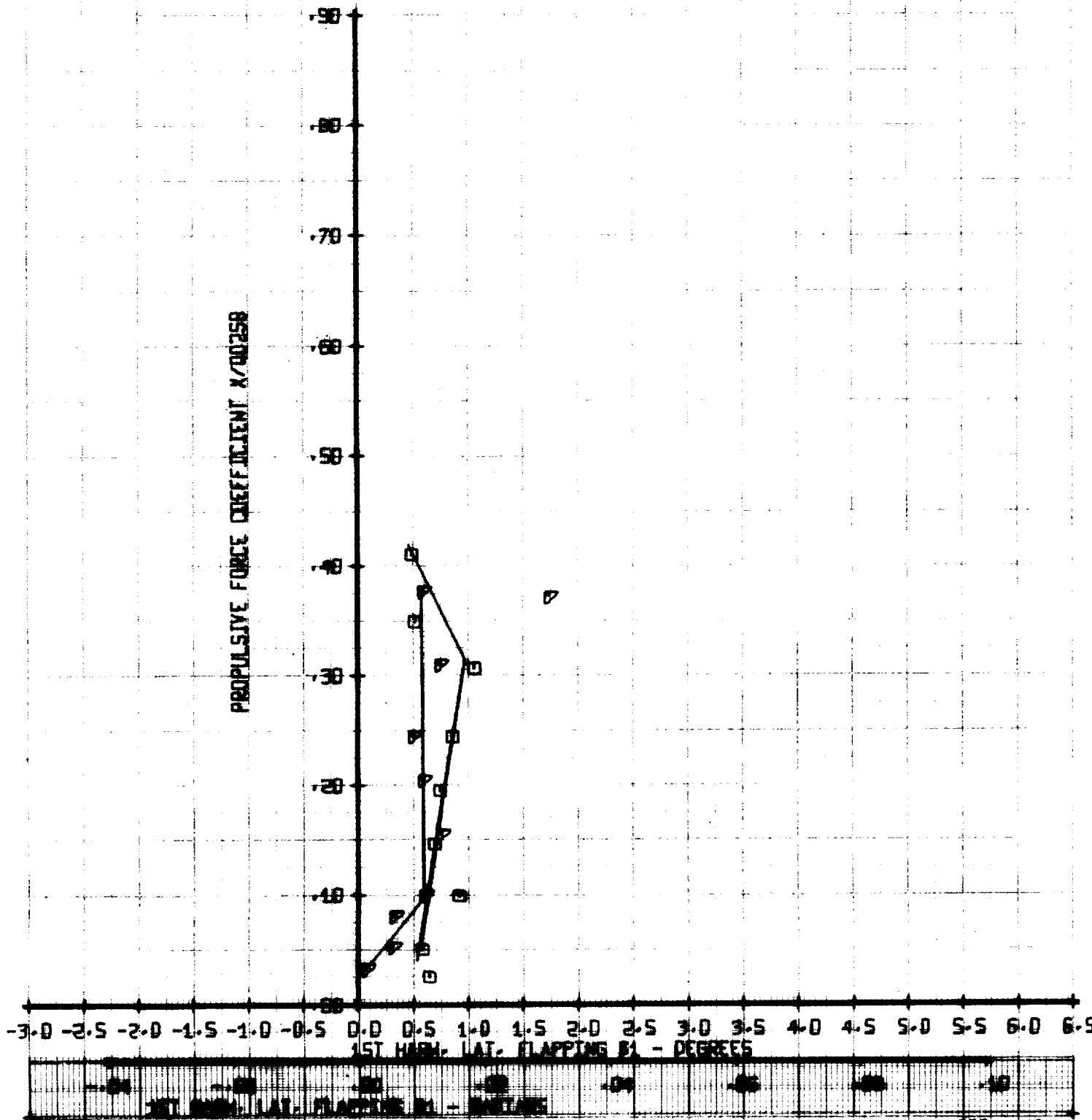


LEFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM
□RUN
243
244MU'
.45
.45CT' / 258
.06
.076VTUN
279
279

PROPULSIVE FORCE COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

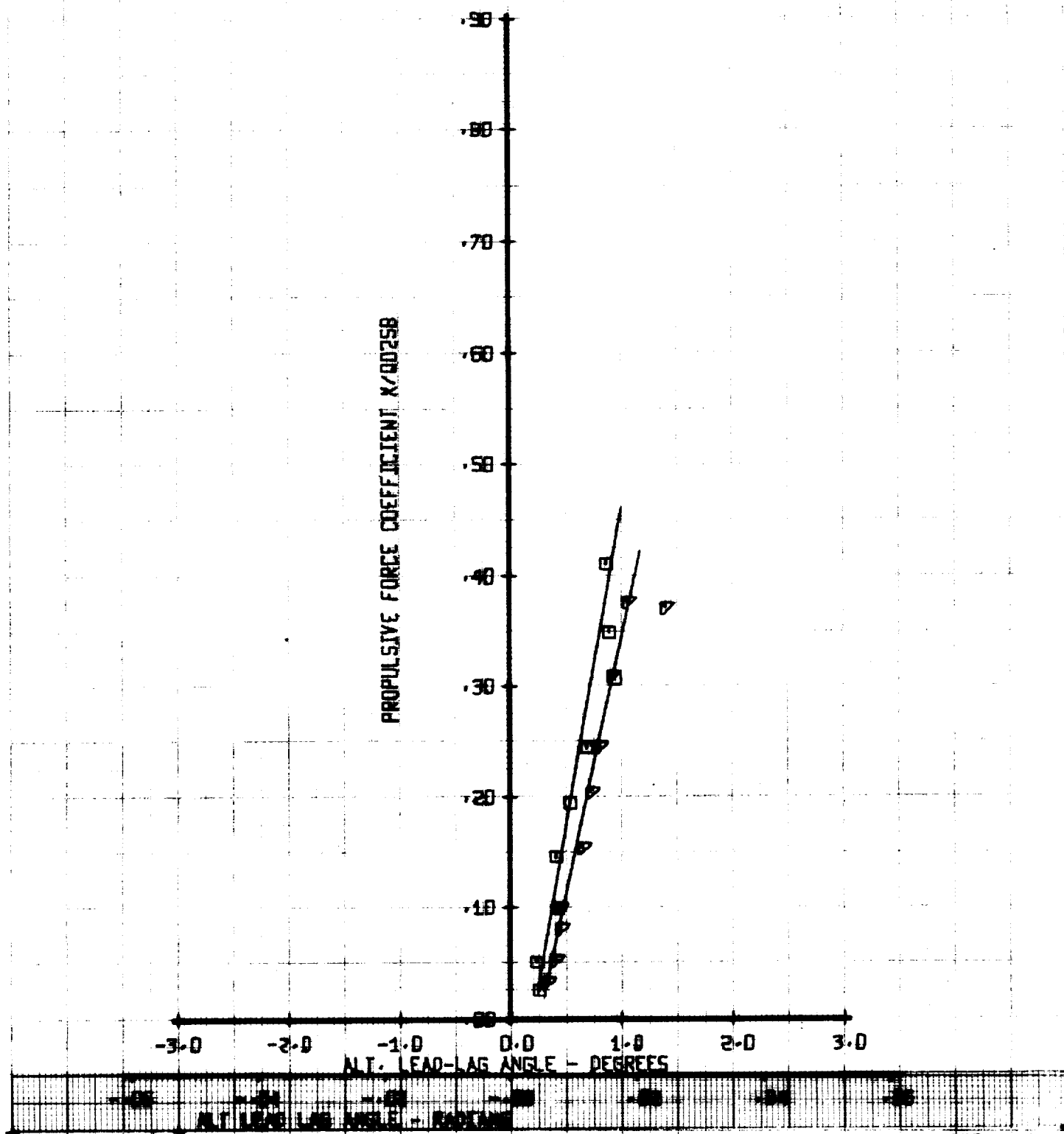


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/SB	YTUN
□	243	.45	.06	279
△	244	.45	.076	279

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING LEAD-LAG ANGLE

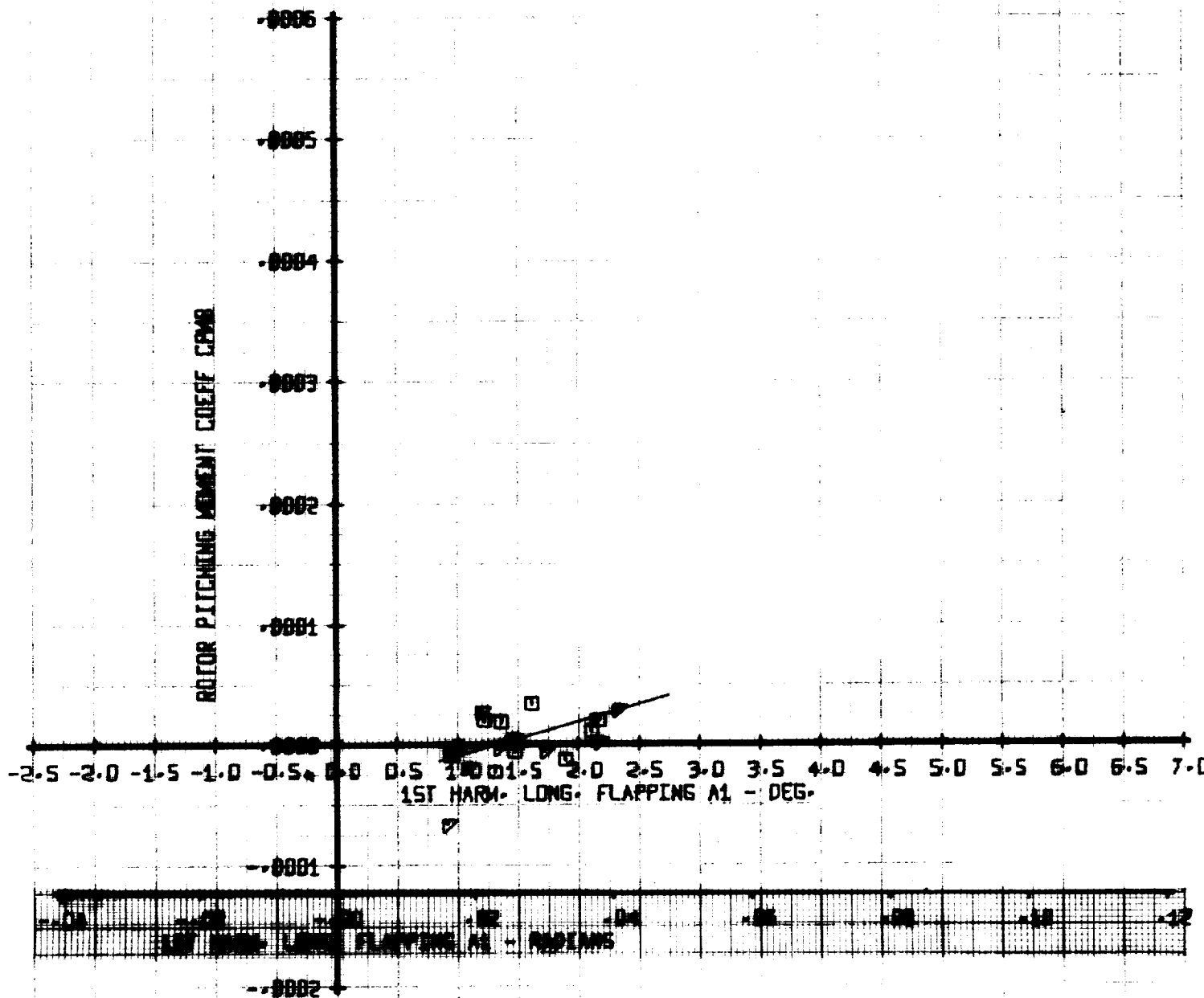


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	YTUN
□	243	.45	.06	279
▽	244	.45	.076	279

ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	YTUN
□	243	.45	.06	279
△	244	.45	.076	279

ROTOR ROLLING MOMENT COEFFICIENT
 VERSUS
 1ST HARMONIC LATERAL FLAPPING B1

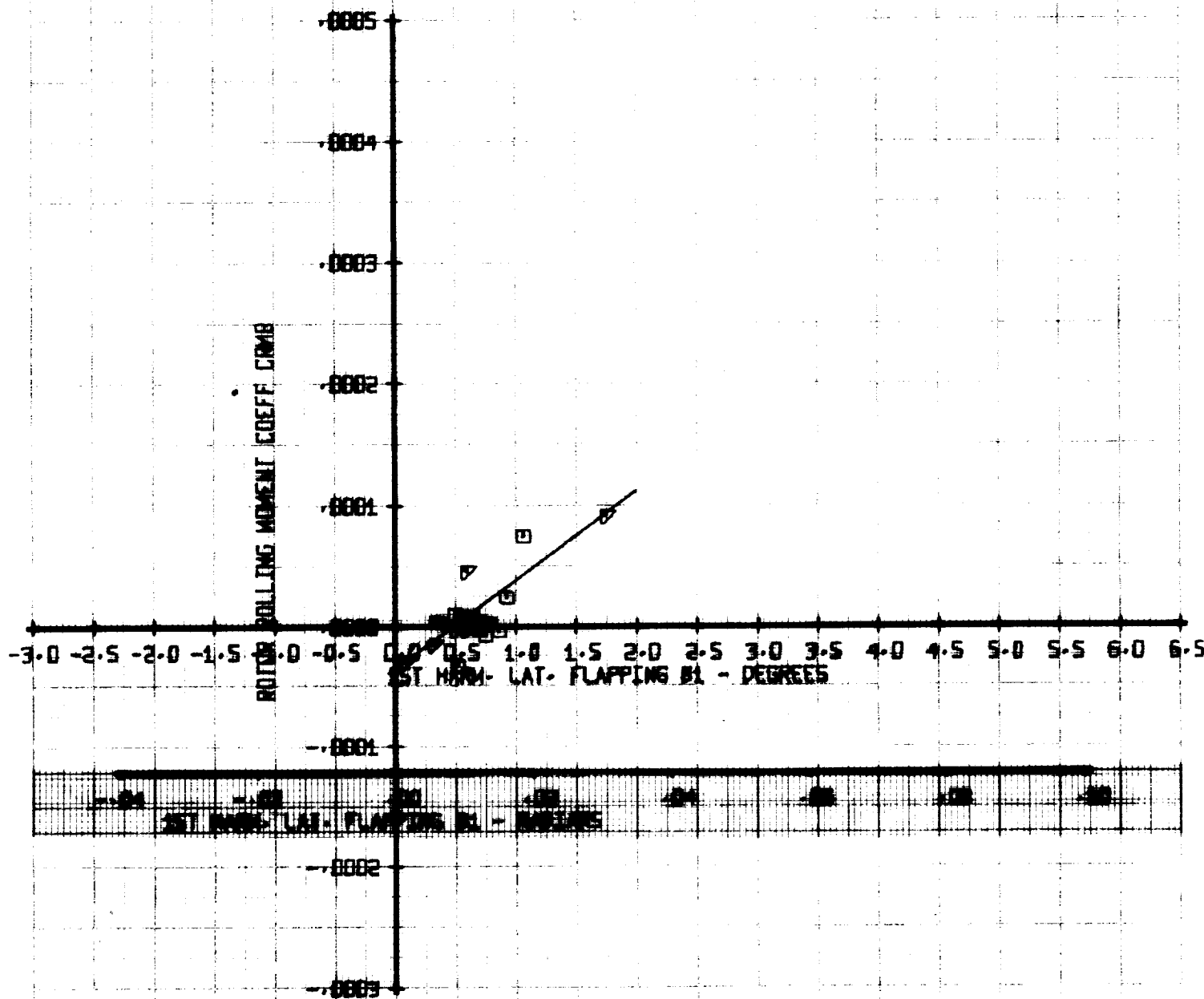


Figure B-89

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VTUN
□	232	.50	.06	311
△	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PROPULSIVE FORCE COEFFICIENT

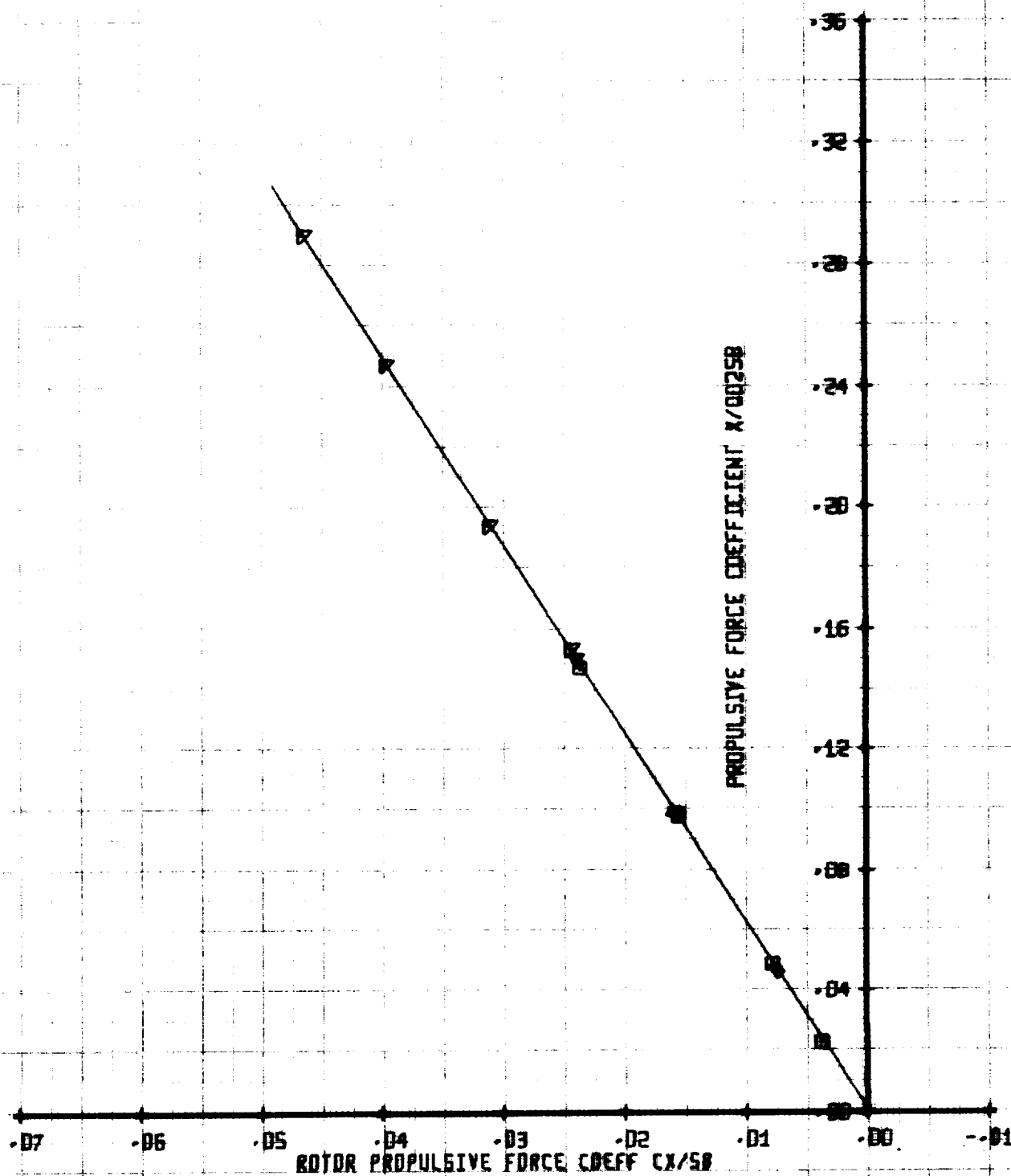


Figure B-90

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VTUN
□	232	.50	.06	311
△	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 SHAFT ANGLE OF ATTACK

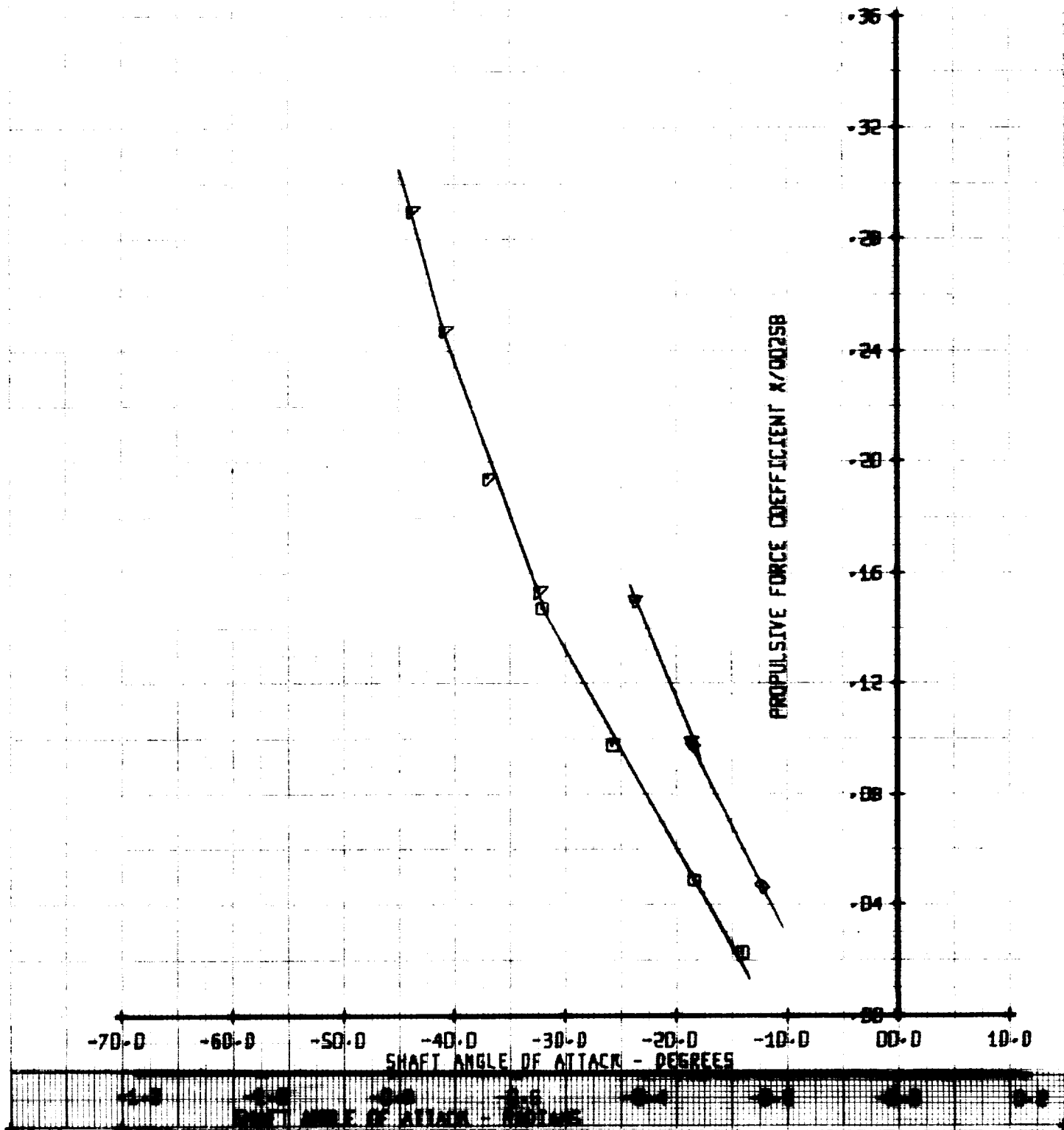


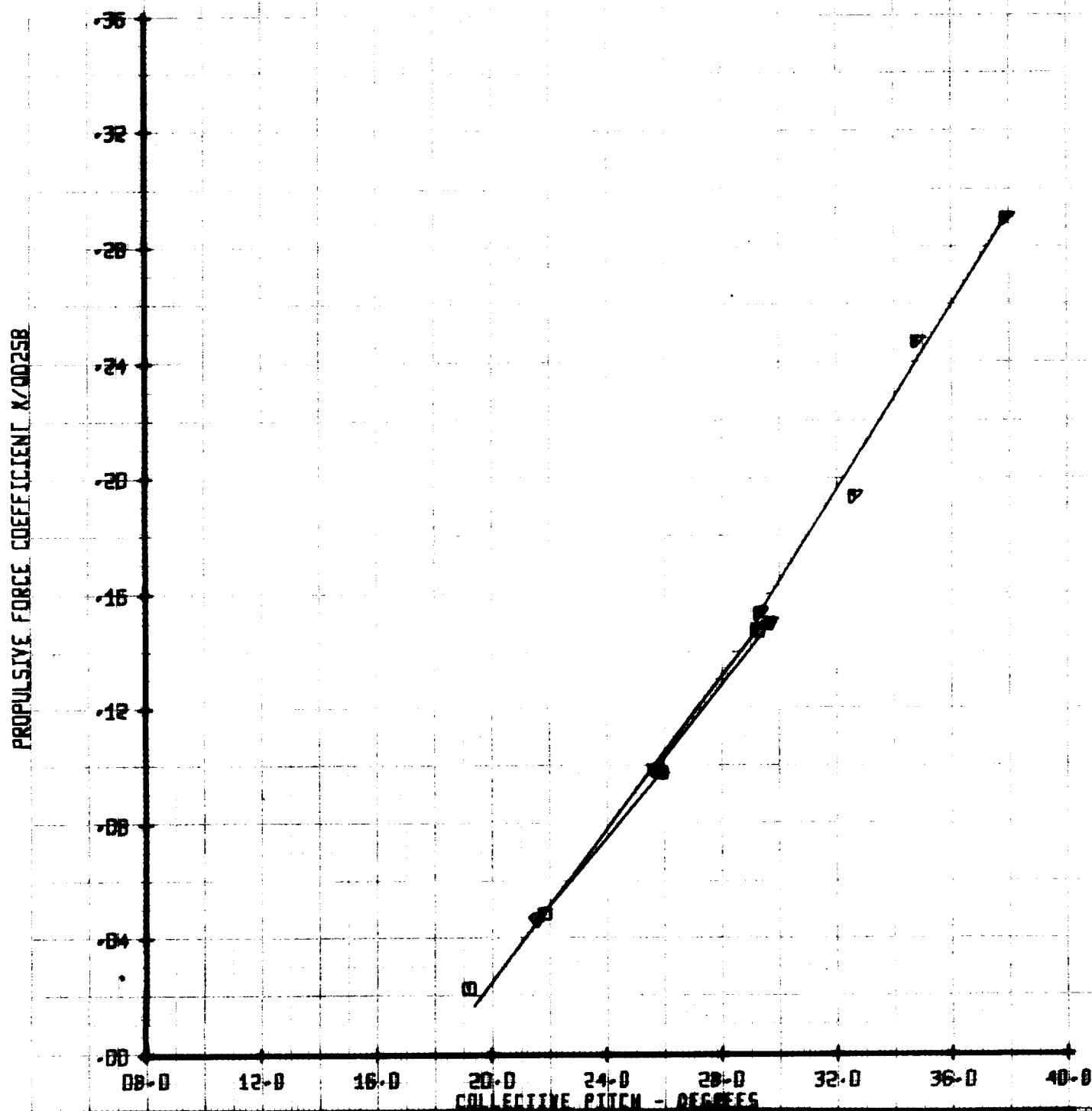
Figure B-91

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT/VSB	VTUN
□	232	.50	.06	311
△	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 COLLECTIVE PITCH

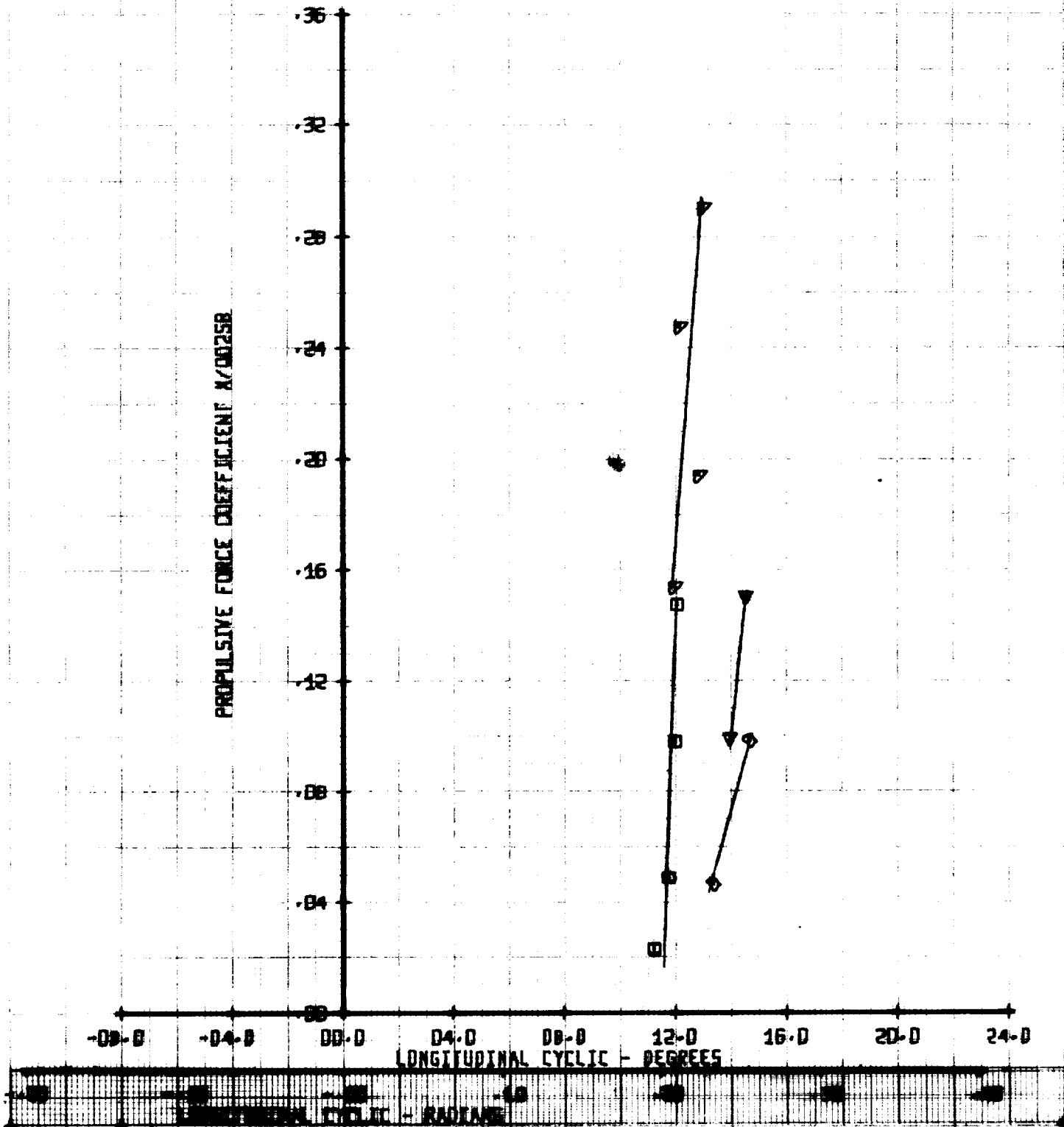


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU	CT/58	VTUN
□	232	.50	.06	311
△	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LONGITUDINAL CYCLIC

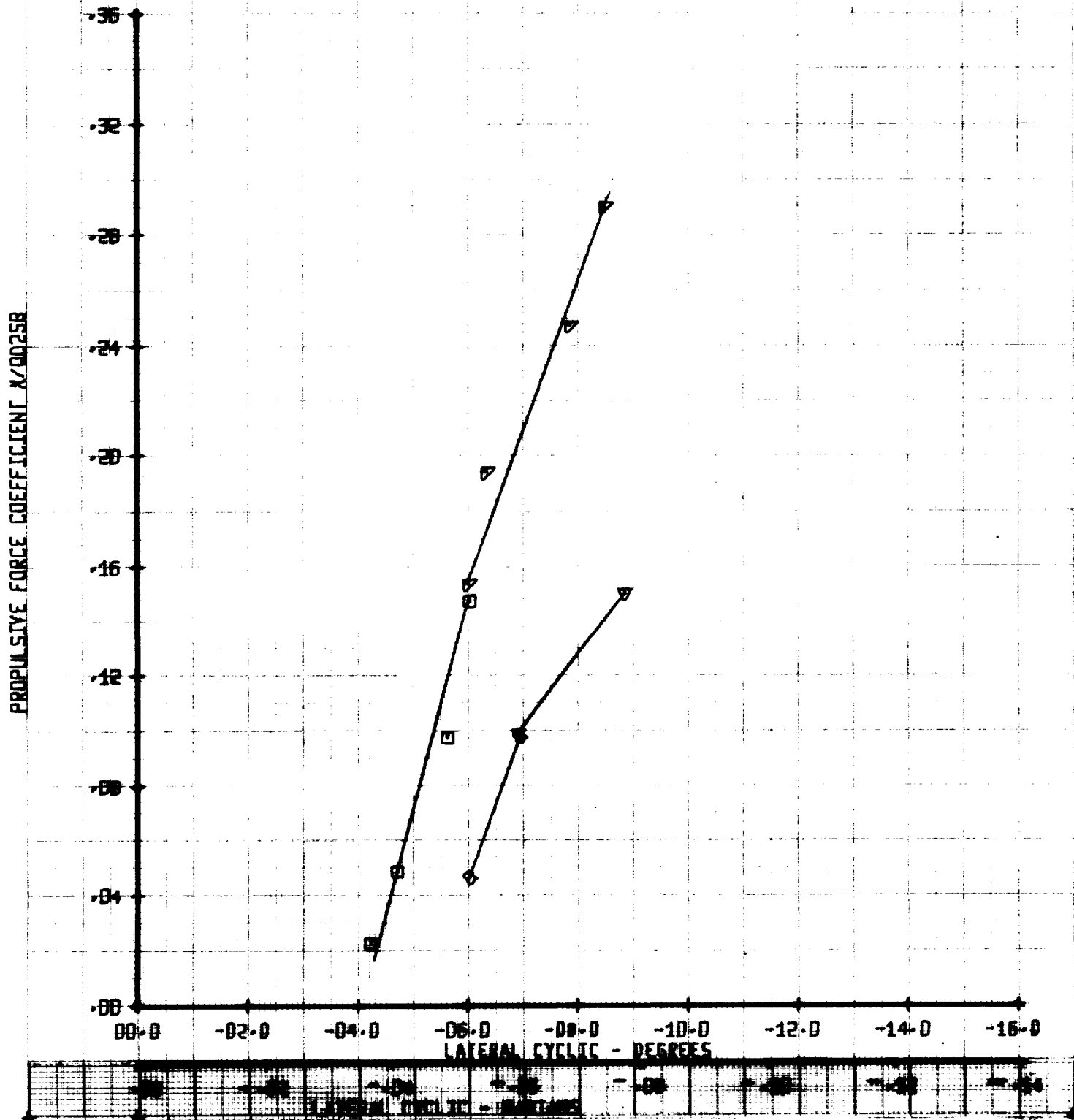


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI	CT/58	VTUN
□	232	.50	.06	311
△	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

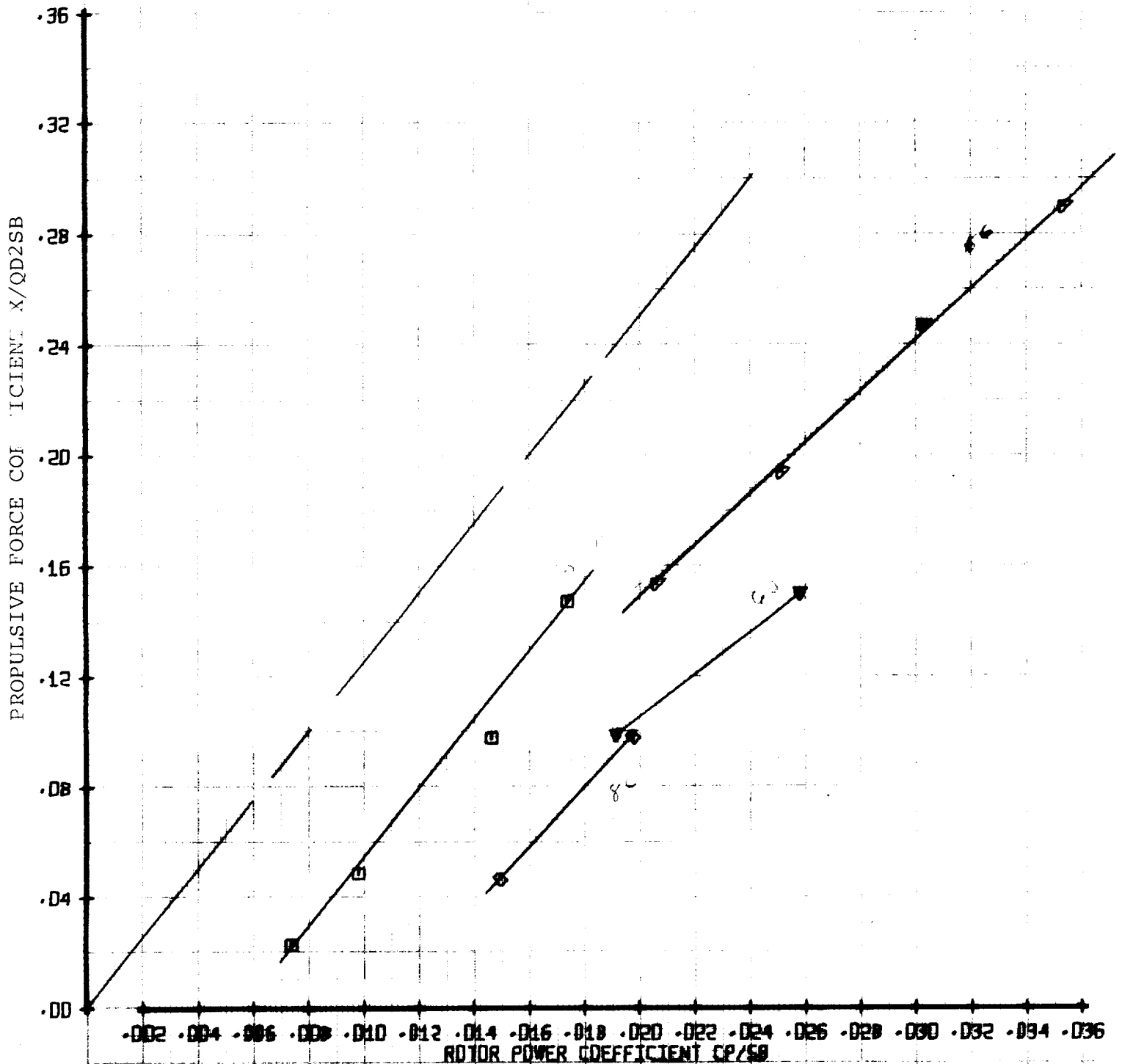
PROPULSIVE FORCE COEFFICIENT
VERSUS
LATERAL CYCLIC



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MU'	CT'/SB	VTUN
□	232	.50	.06	311
◇	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

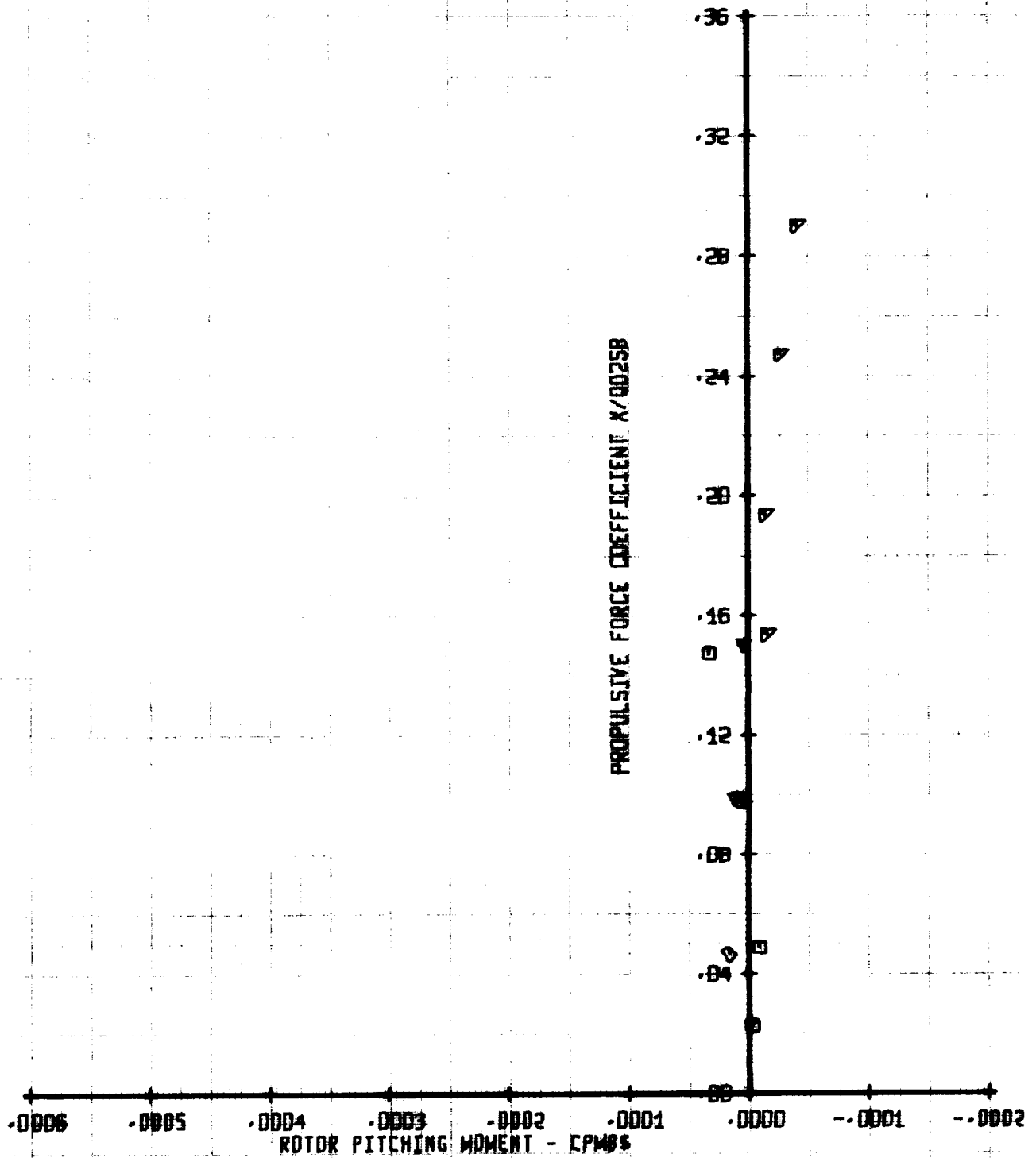
PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MU'	CT'Y8B	VTUN
□	232	.50	.06	311
△	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

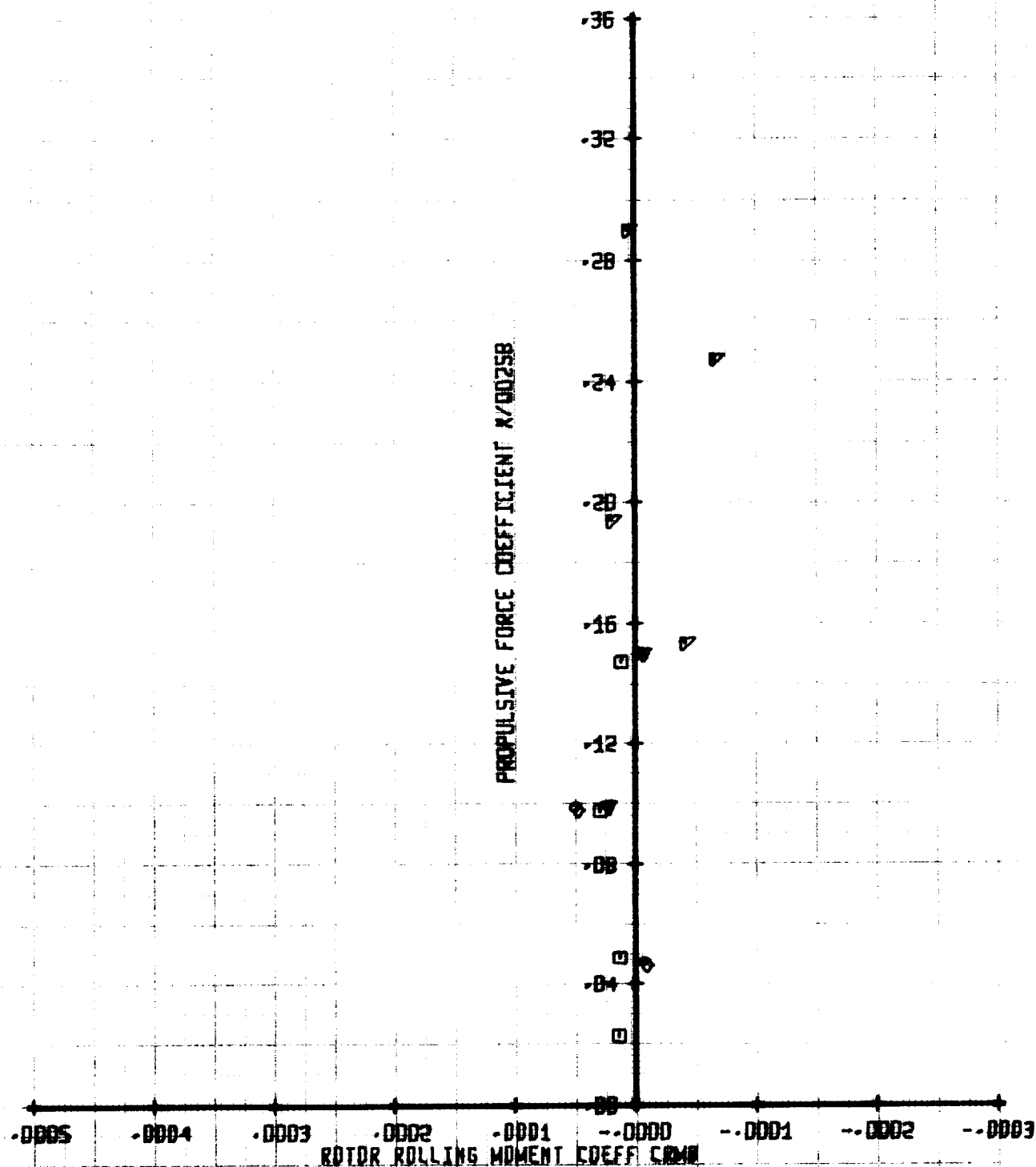
PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PITCHING MOMENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MU	CT/YSB	VTLM
□	232	.50	.06	311
◇	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT

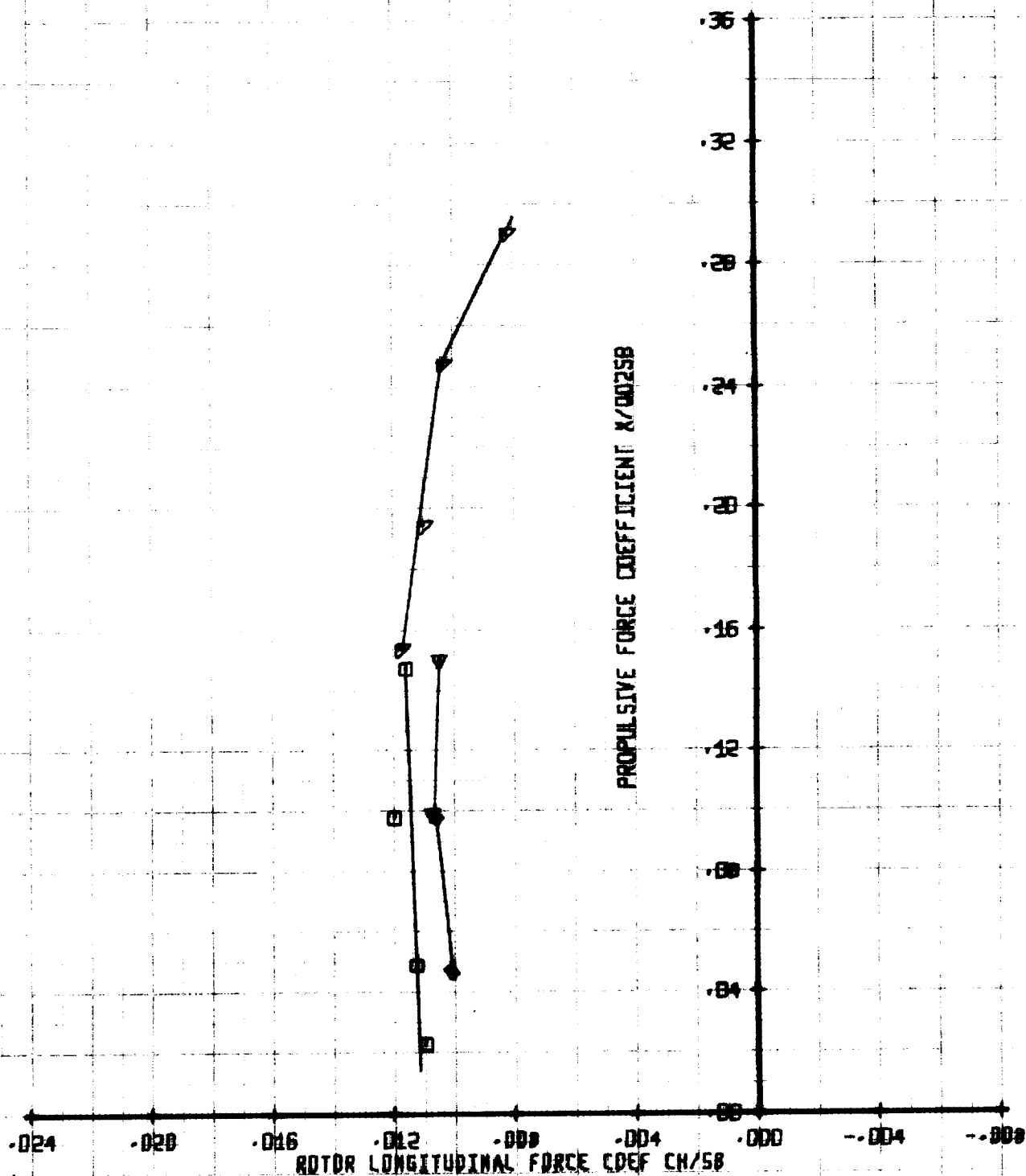


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/SB	VTUN
□	232	.50	.06	311
○	233	.50	.06	311
△	234	.50	.08	311
▽	235	.50	.08	311

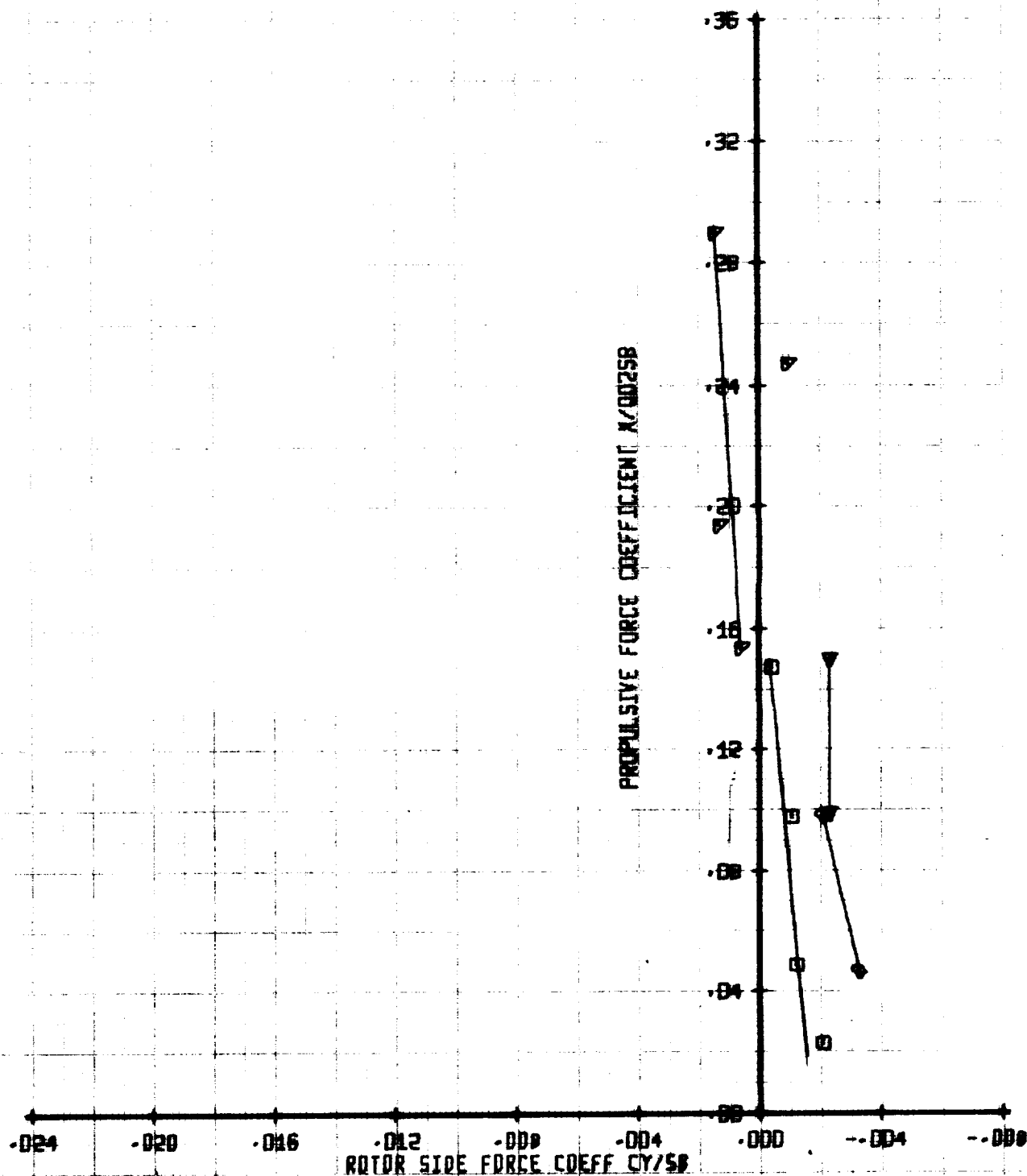
PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

		LEGEND		
SYM	RUN	MI'	CI'Y58	VTUN
□	232	.50	.06	311
◇	233	.50	.06	311
△	234	.50	.08	311
▽	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT



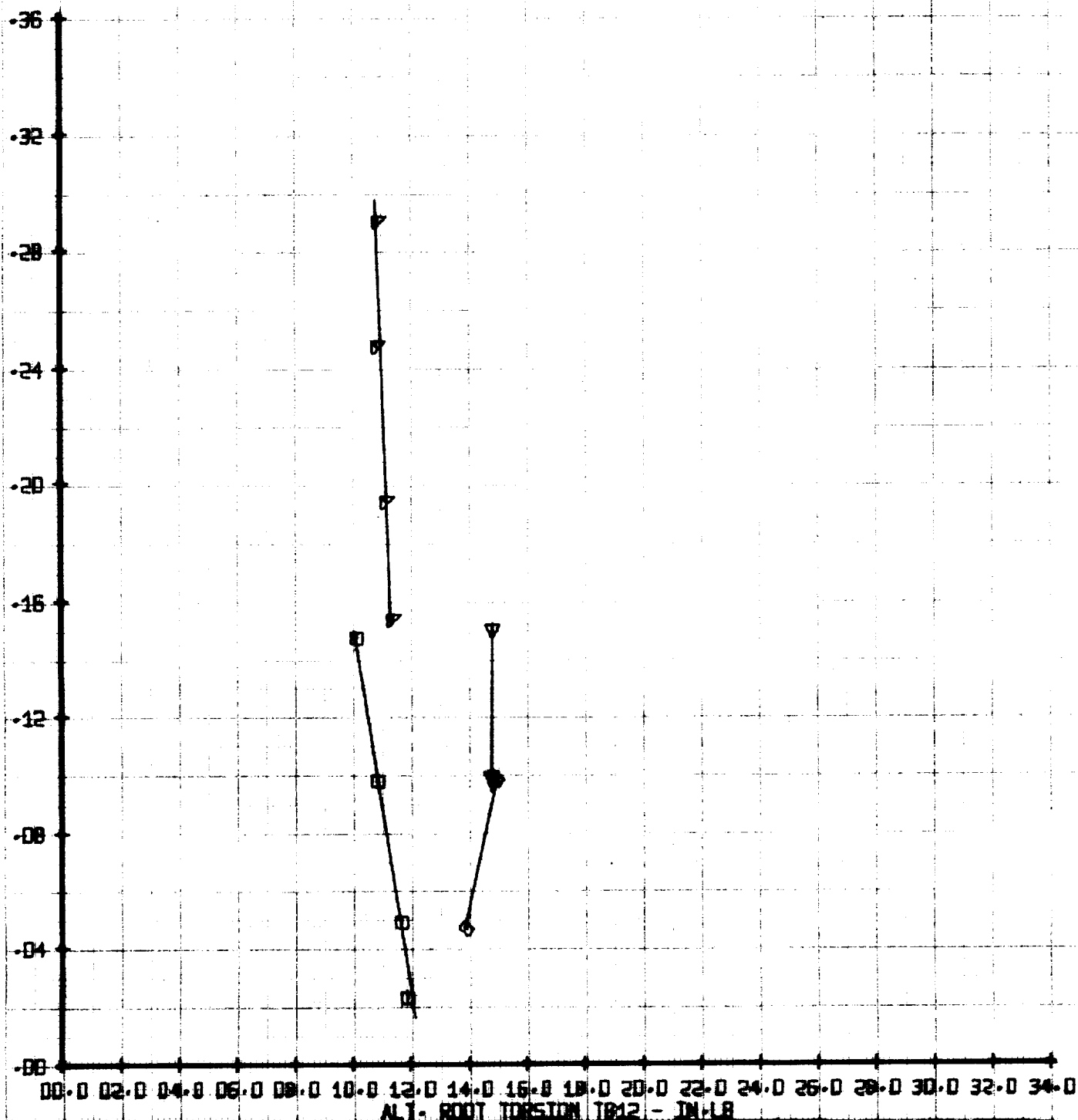
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	REV	ML'	CT'/58	YTLN
□	232	.50	.06	311
▧	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

PROPULSIVE FORCE COEFFIC IT X/00258

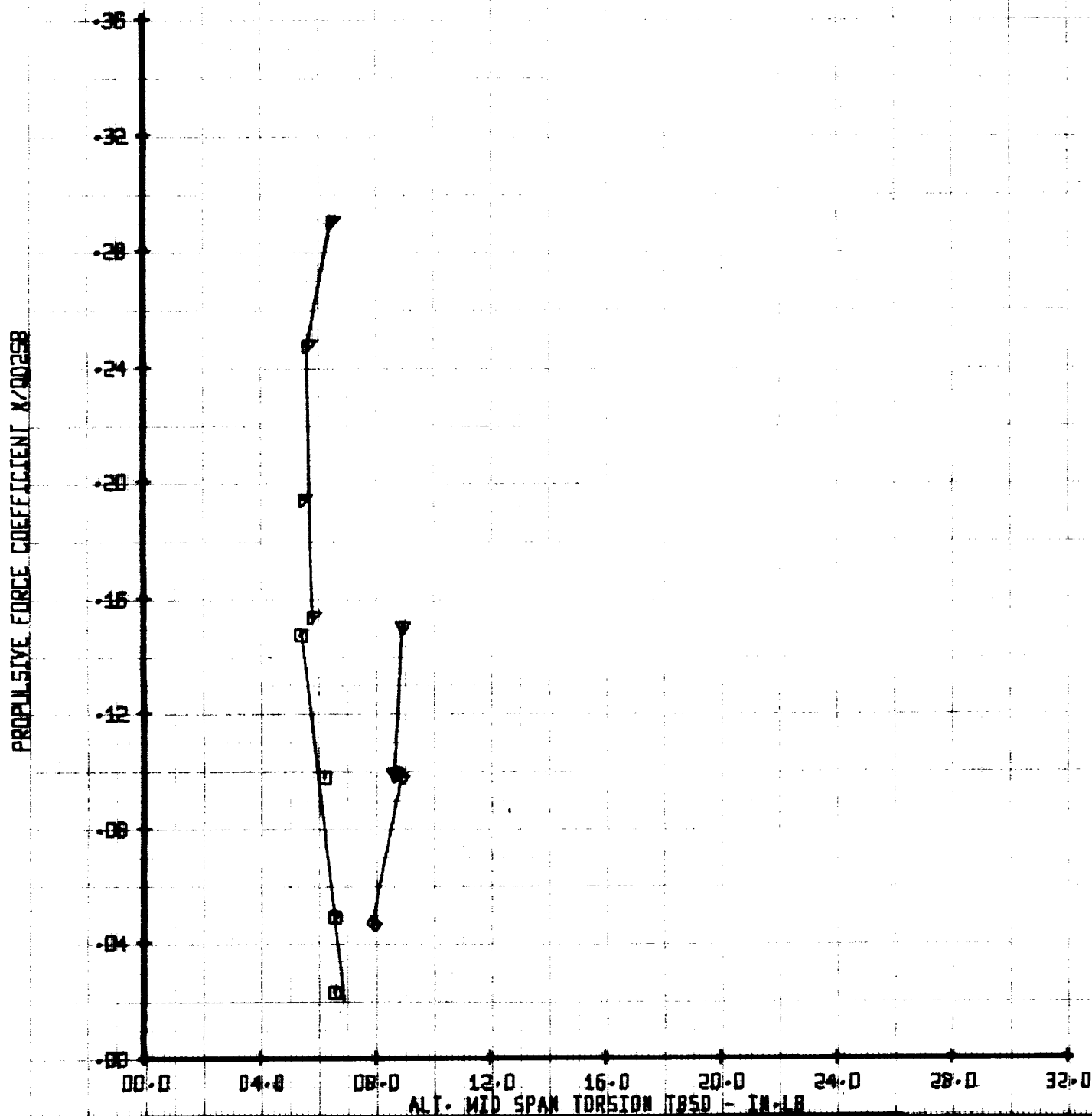


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU	CT/58	YTDN
□	232	.50	.06	311
△	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50

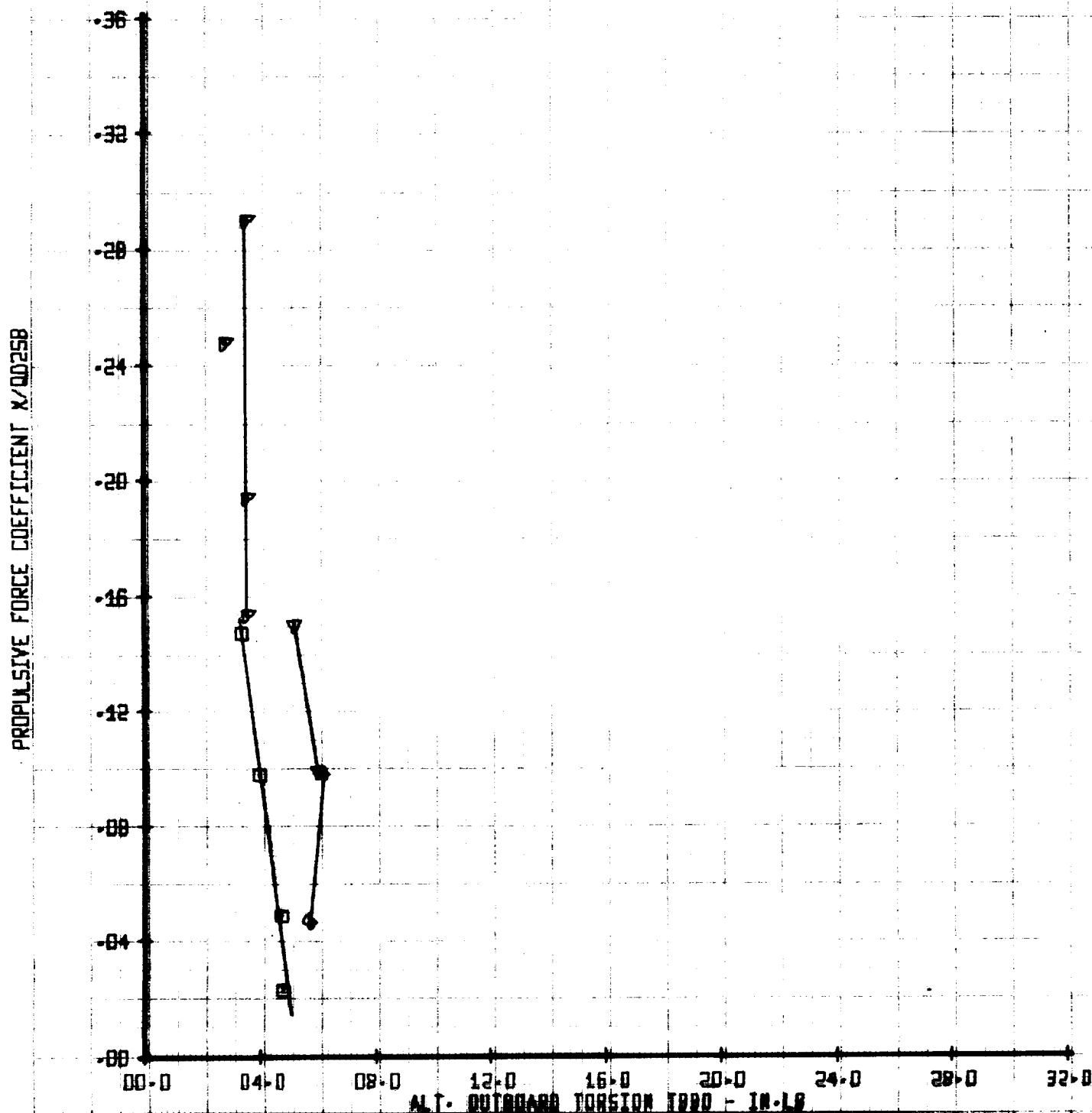


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/58	VTUM
□	232	.50	.06	311
△	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB80

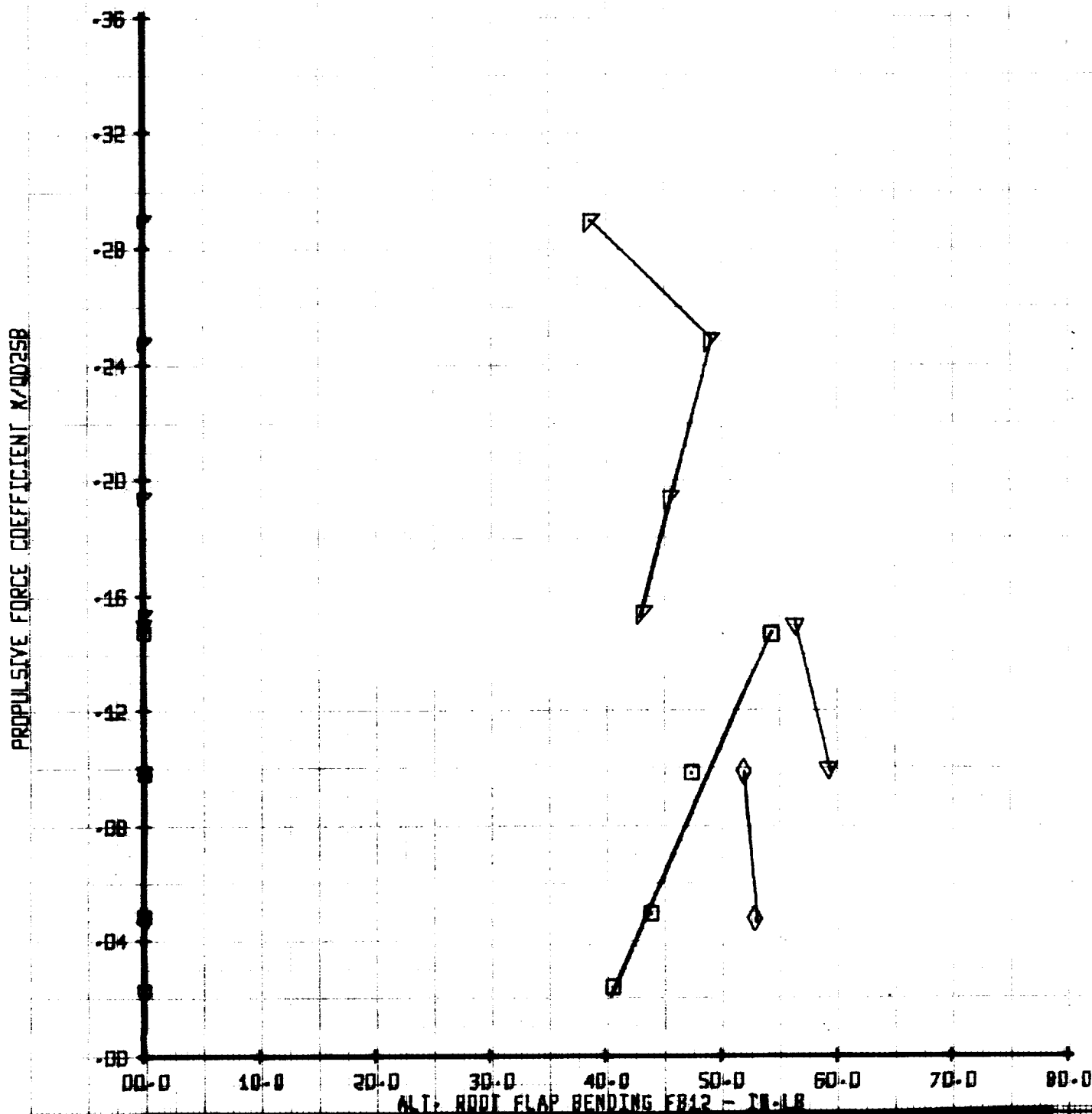


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/SB	VTUN
□	232	.50	.06	311
▽	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12



ALT. ROOT FLAP BENDING FB12 - IN-LB

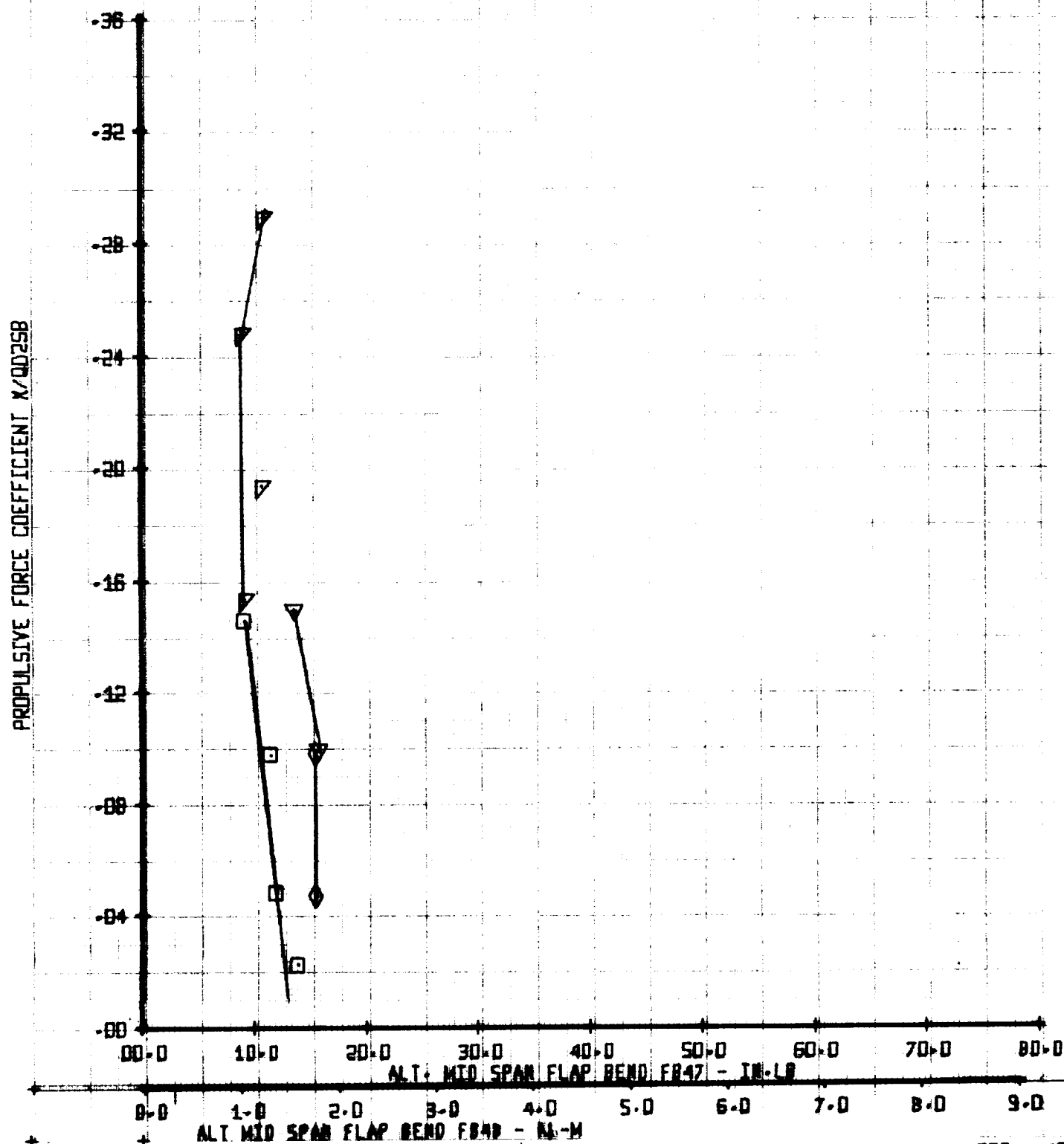
ALT. ROOT FLAP BENDING FB12 - IN-LB

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/58	VTUM
□	232	.50	.06	311
▽	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING MID SPAN FLAP BENDING FB47

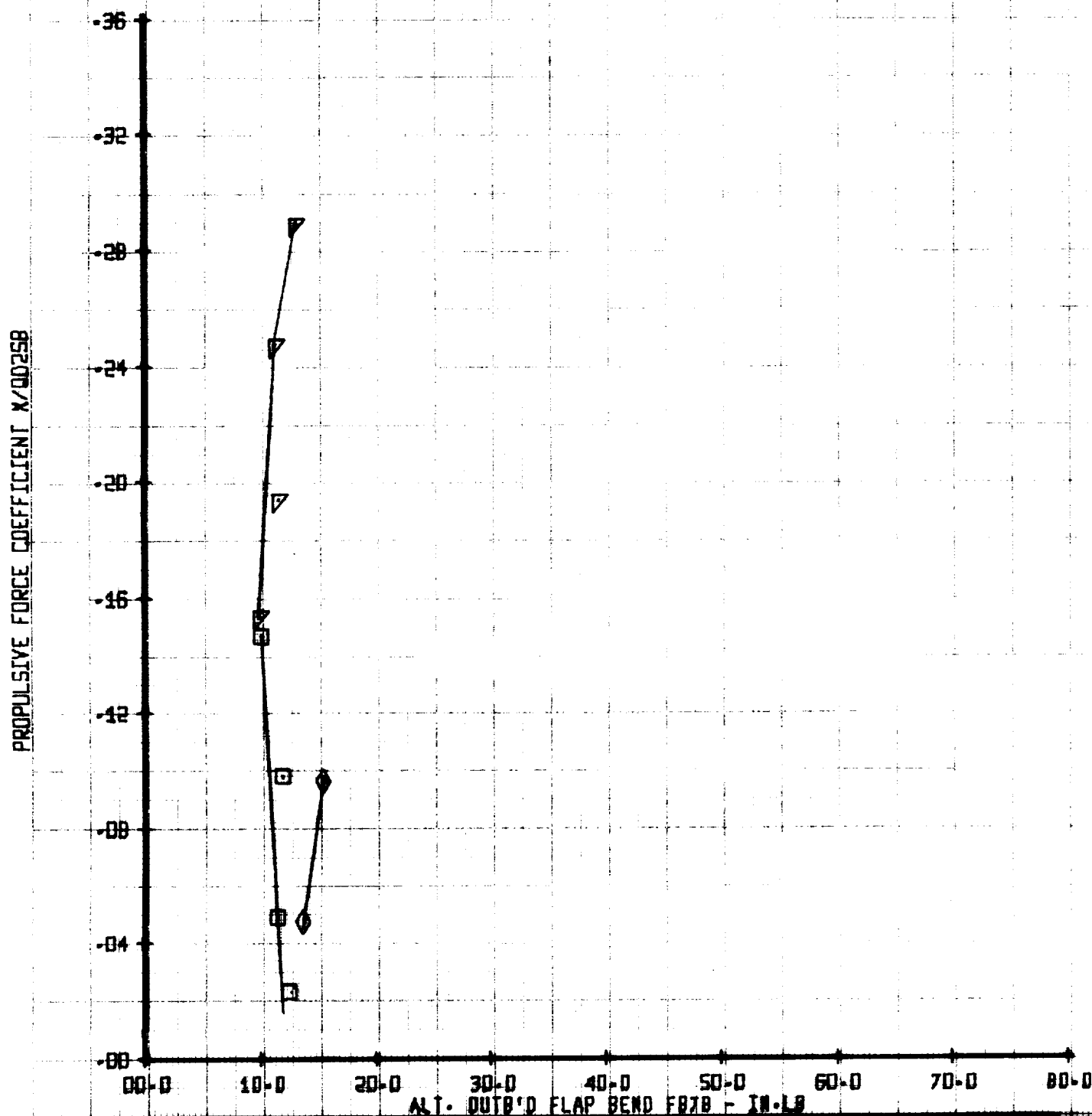


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT' / SB	YTLN
□	232	.50	.06	311
▽	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

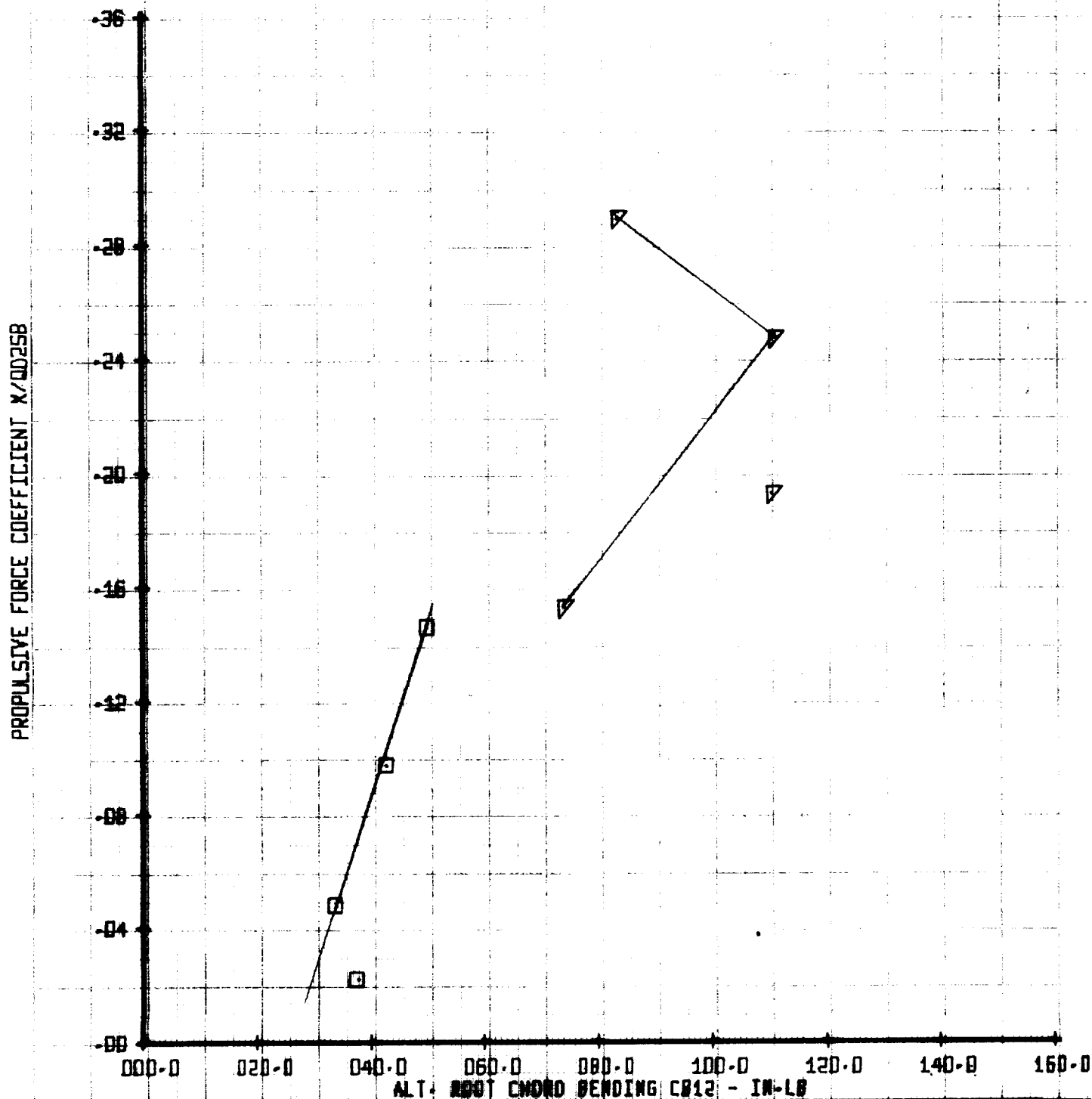
PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING OUTBOARD FLAP BENDING FB78



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MU'	CT'/58	VTUN
□	232	.50	.06	311
▽	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

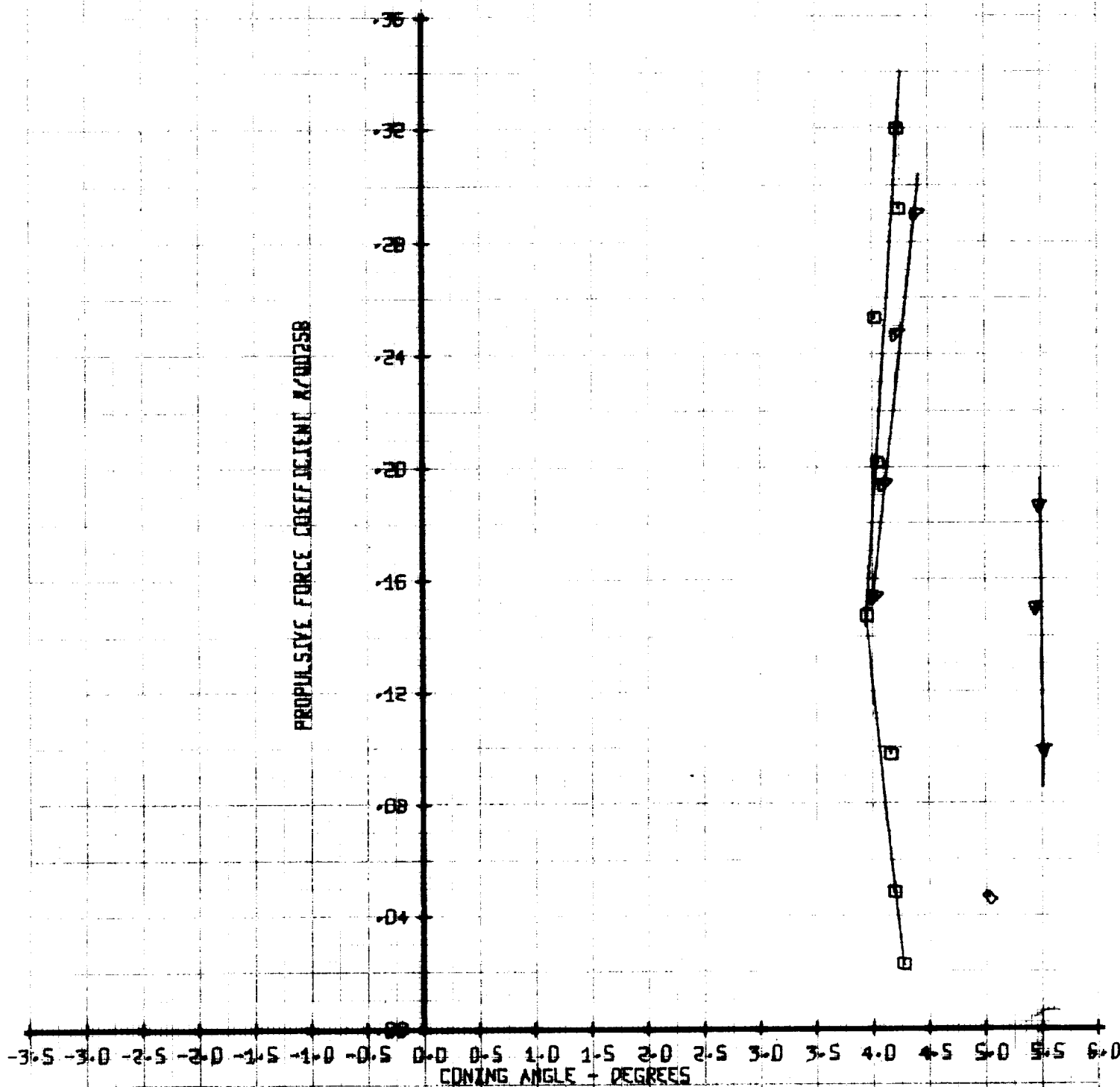


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'258	VTUN
□	232	.50	.06	311
△	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
CONING ANGLE

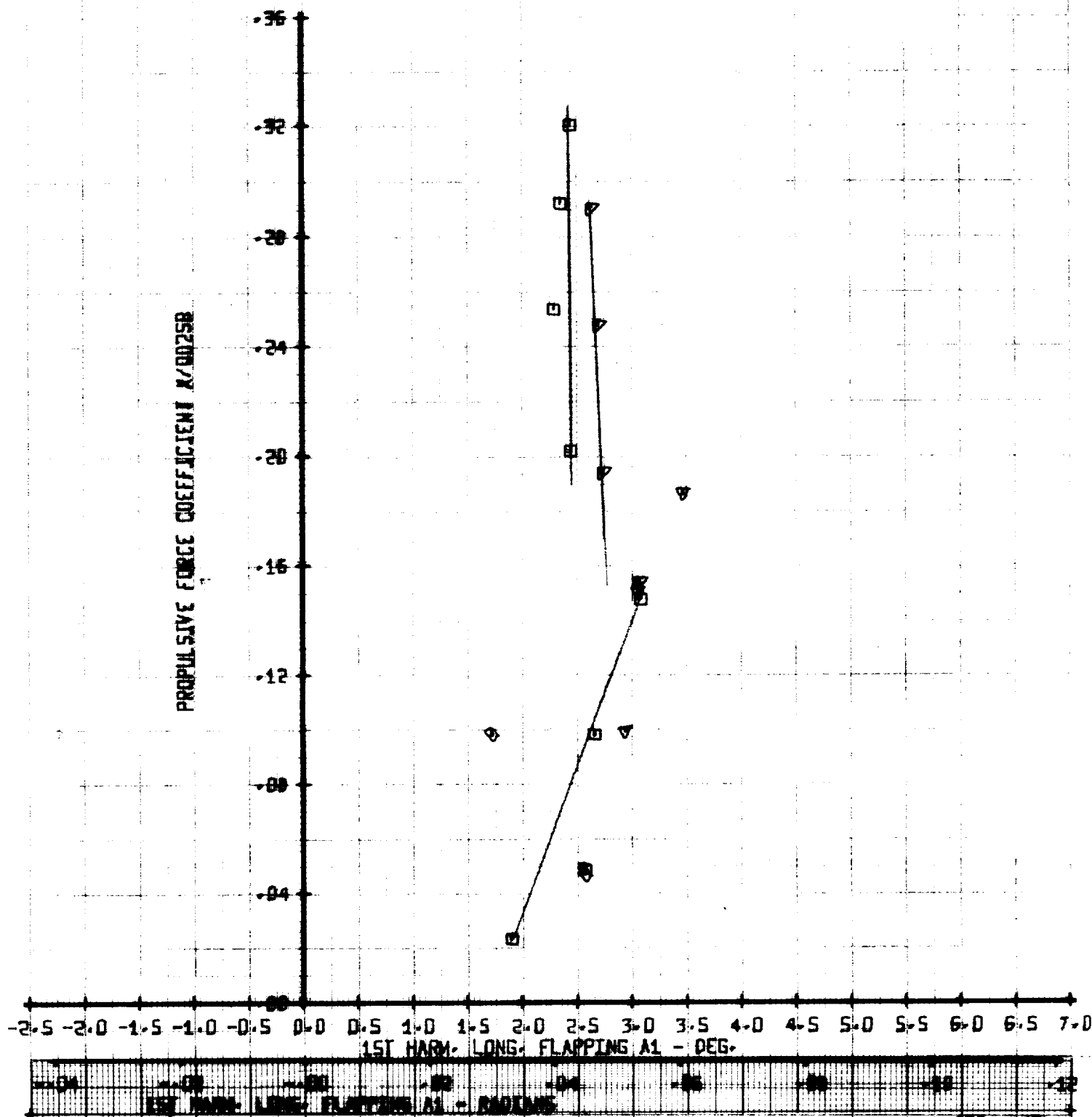


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' 258	YTLN
○	232	.50	.06	311
□	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

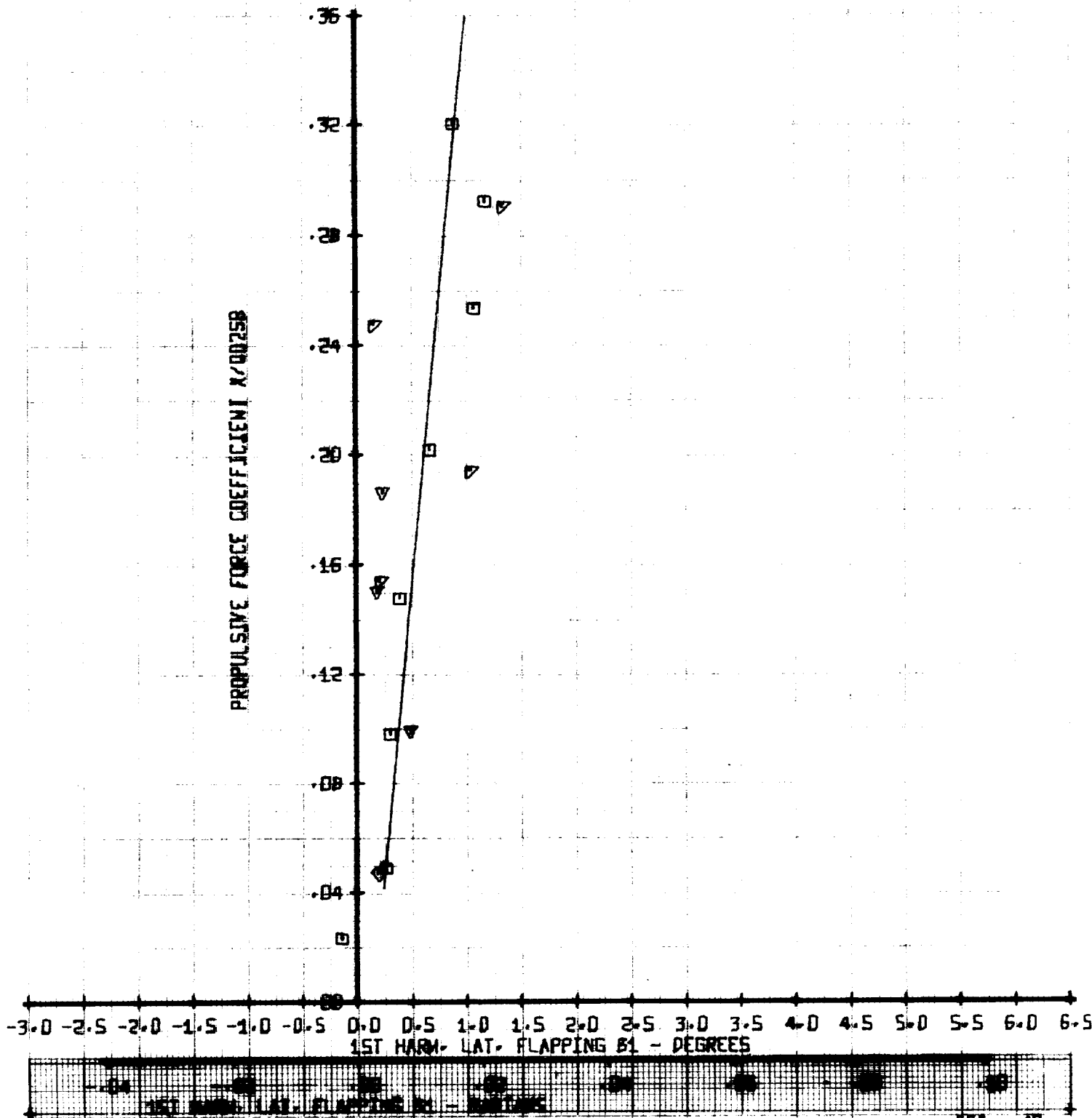
PROPULSIVE FORCE COEFFICIENT
 VERSUS
 1ST HARMONIC LONGITUDINAL FLAPPING A1



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND				
SYM	RUN	MU'	CT'/SB	YTLIN
□	232	.50	.06	311
◊	233	.50	.06	311
◊	234	.50	.08	311
◊	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

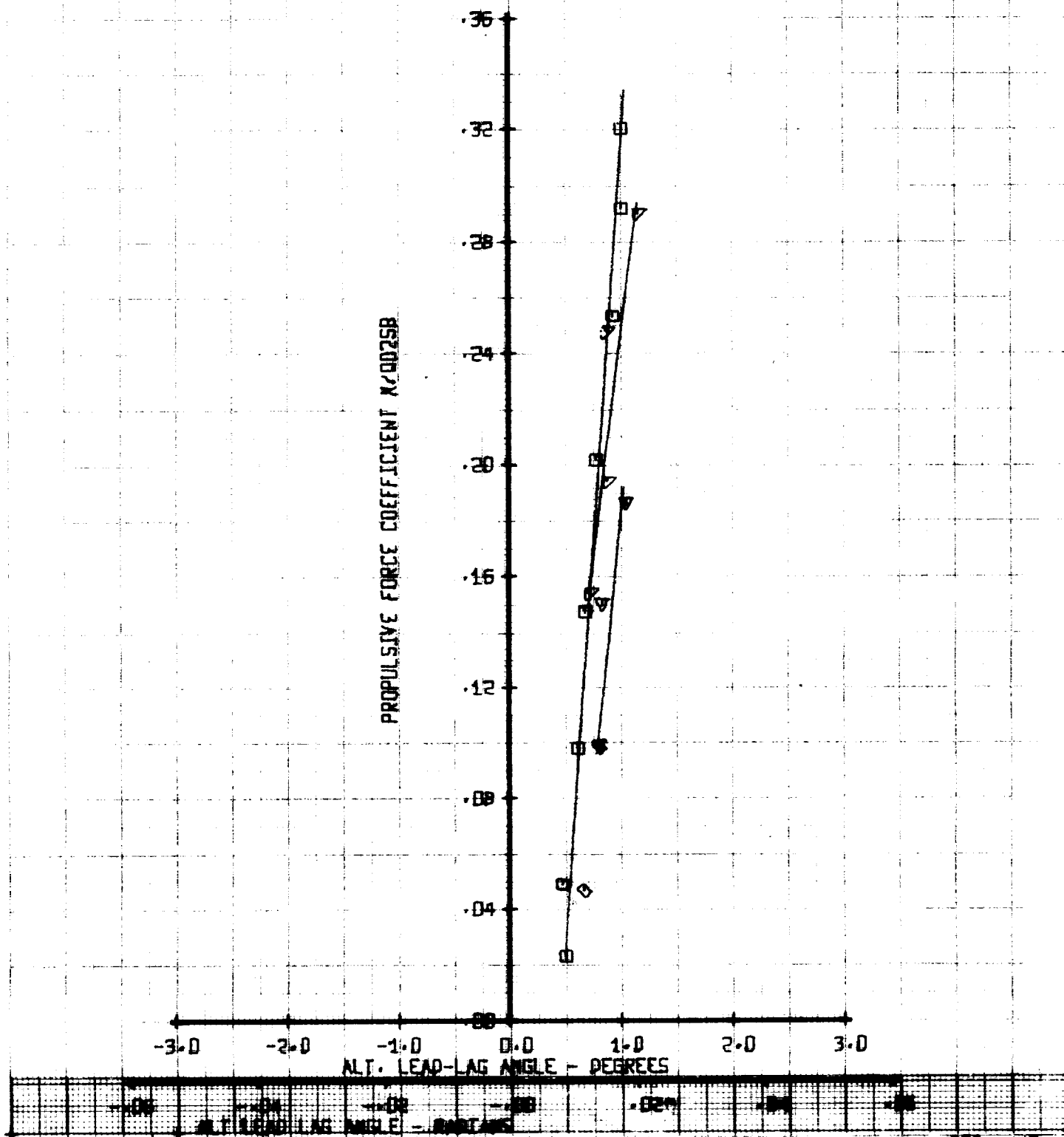


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CN-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT' / 58	YTUN
□	232	.50	.06	311
◇	233	.50	.06	311
◆	234	.50	.08	311
△	235	.50	.08	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE

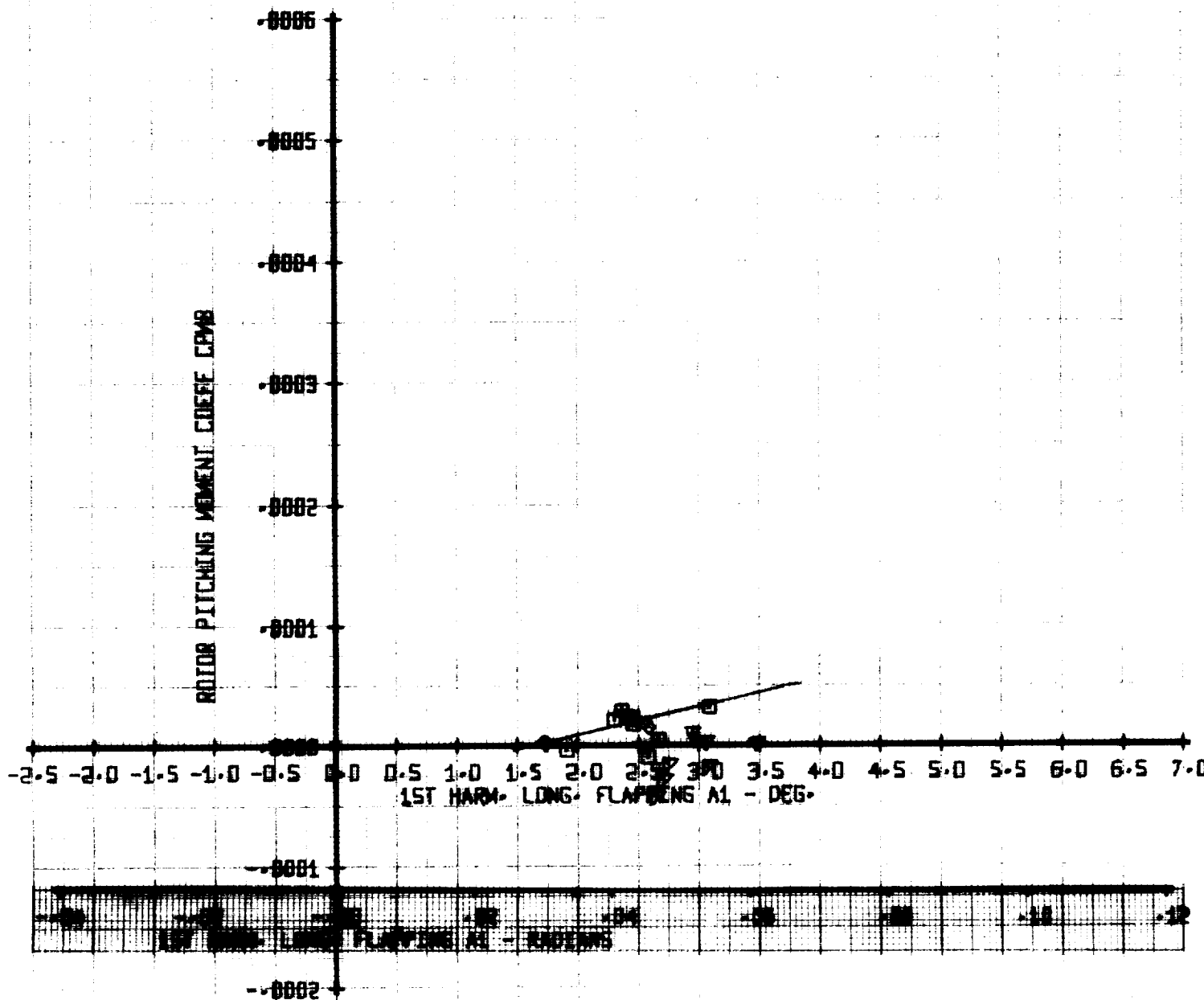


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	YTUN
□	232	.50	.06	311
△	233	.50	.06	311
◇	234	.50	.08	311
▽	235	.50	.08	311

ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1

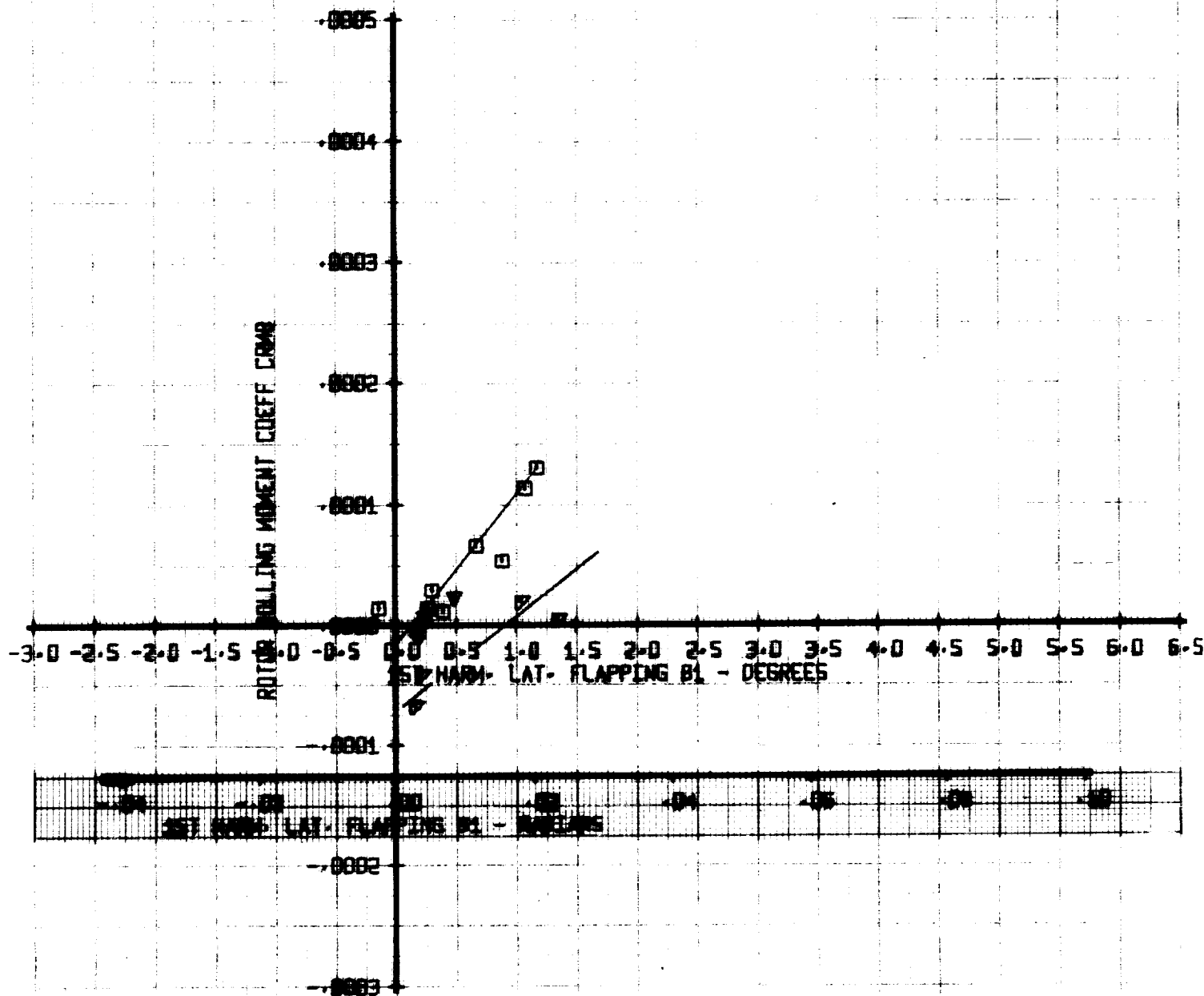


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	BLN	MU'	CT'/58	YTUN
□	232	.50	.06	311
△	233	.50	.06	311
◆	234	.80	.08	311
▽	235	.50	.08	311

ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

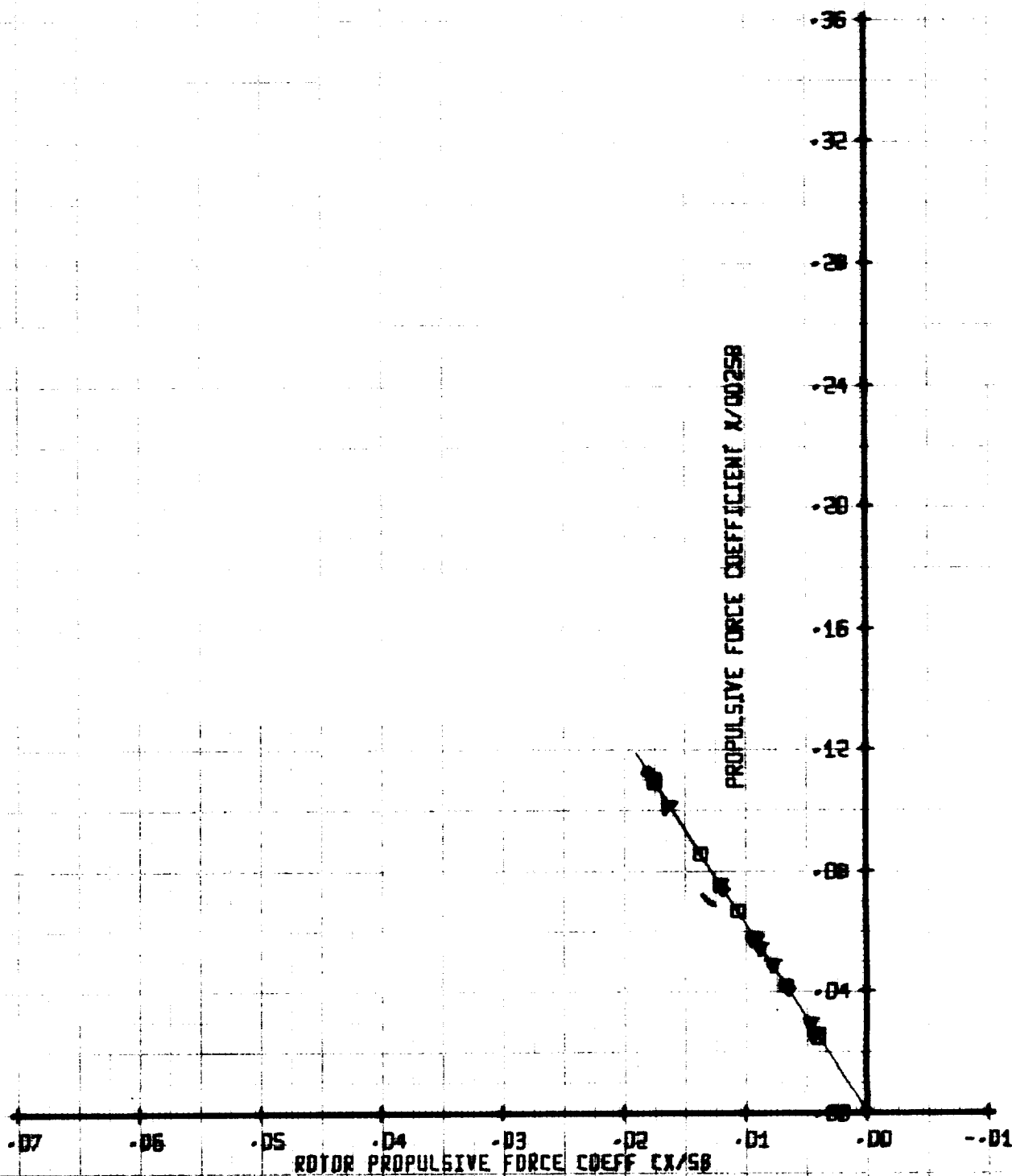


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	YTDN
□	269	.50	.05	311
△	270	.50	.07	311
◆	271	.50	.08	311
▼	272	.50	.10	311

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PROPULSIVE FORCE COEFFICIENT

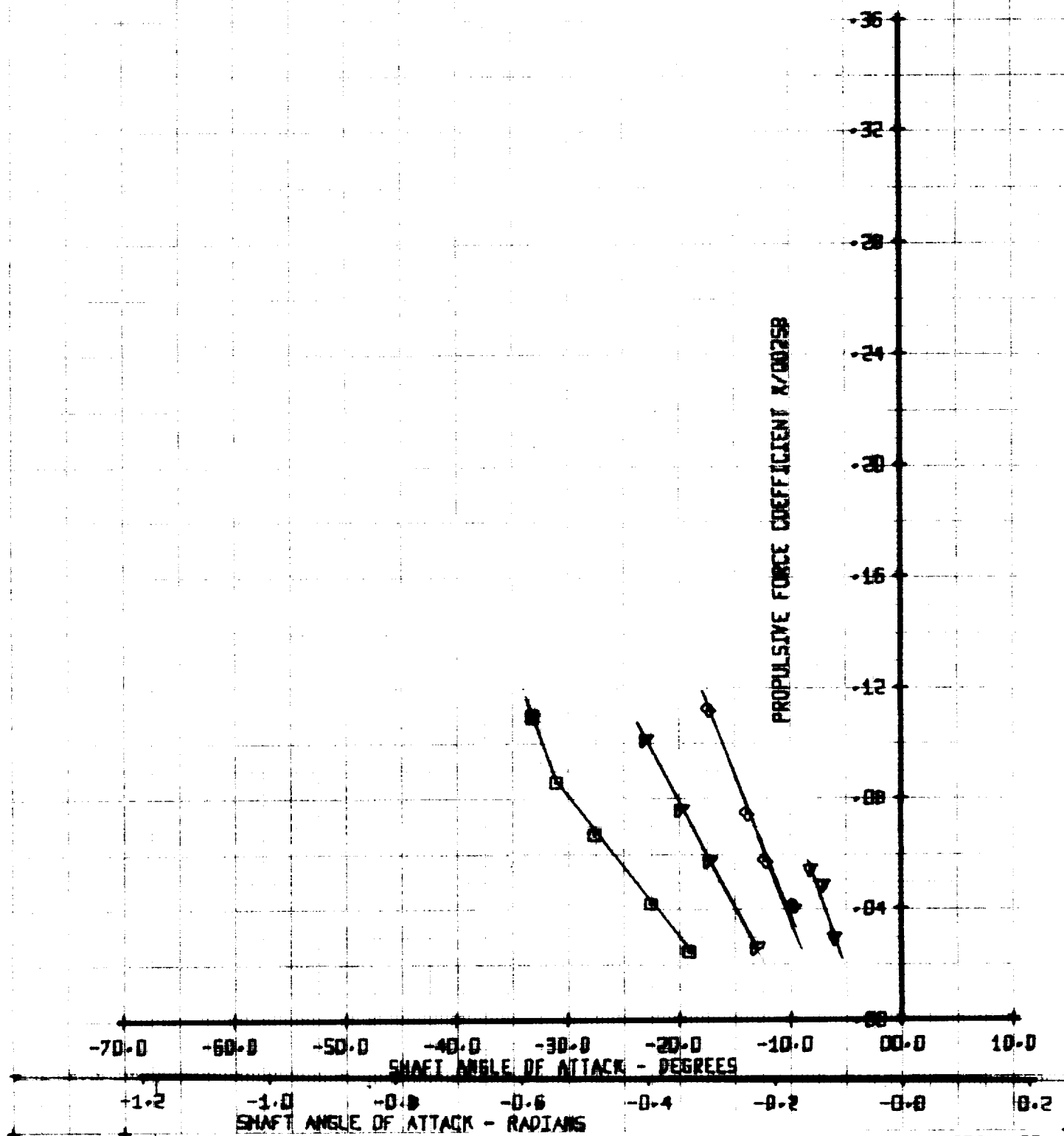


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT'Y5B	YTLIN
□	269	.50	.05	311
△	270	.50	.07	311
◆	271	.50	.09	311
▼	272	.50	.10	311

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 SHAFT ANGLE OF ATTACK

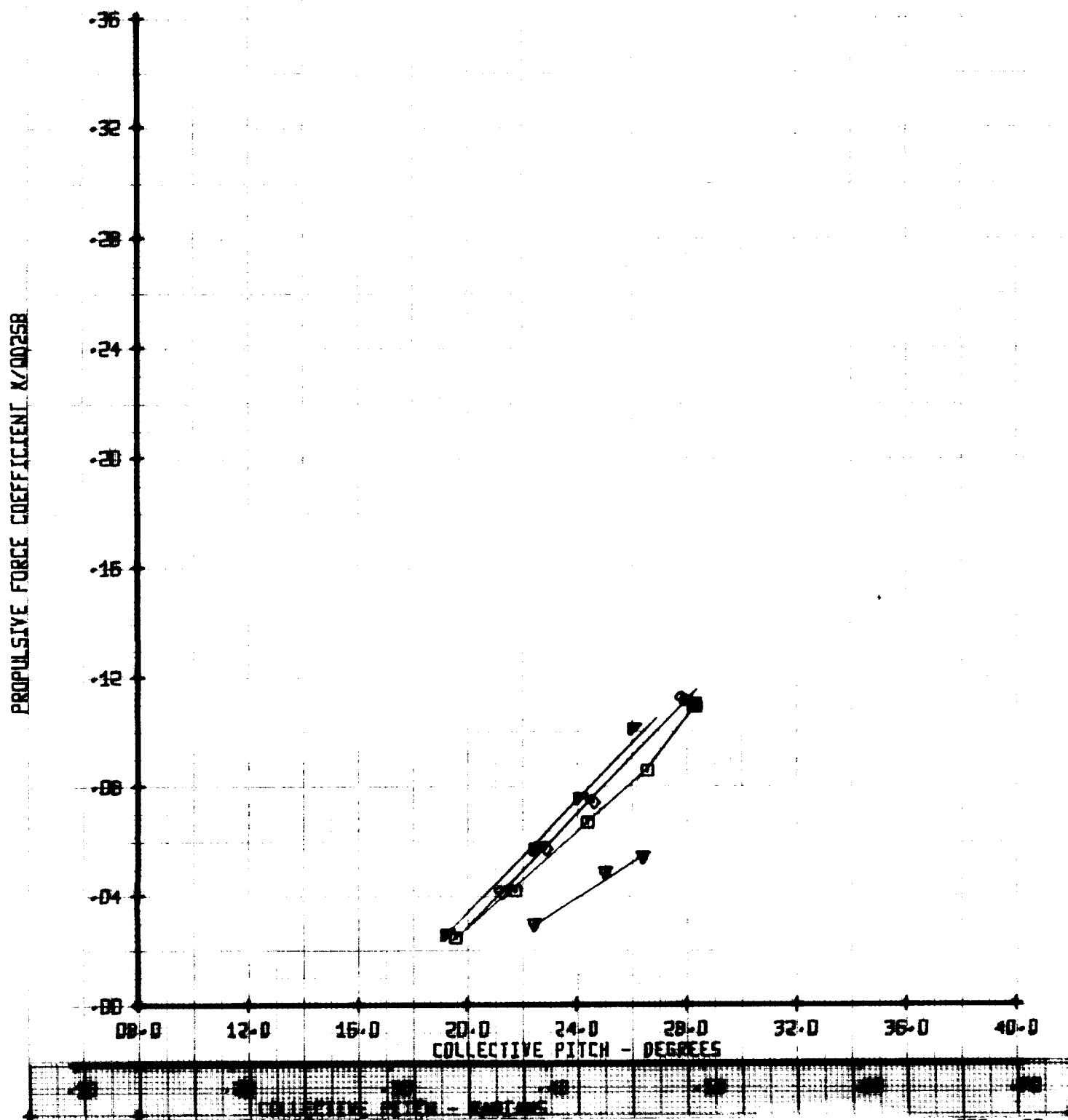


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / SB	VTUN
□	269	.50	.05	311
▢	270	.50	.07	311
◊	271	.50	.09	311
▼	272	.50	.10	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
COLLECTIVE PITCH

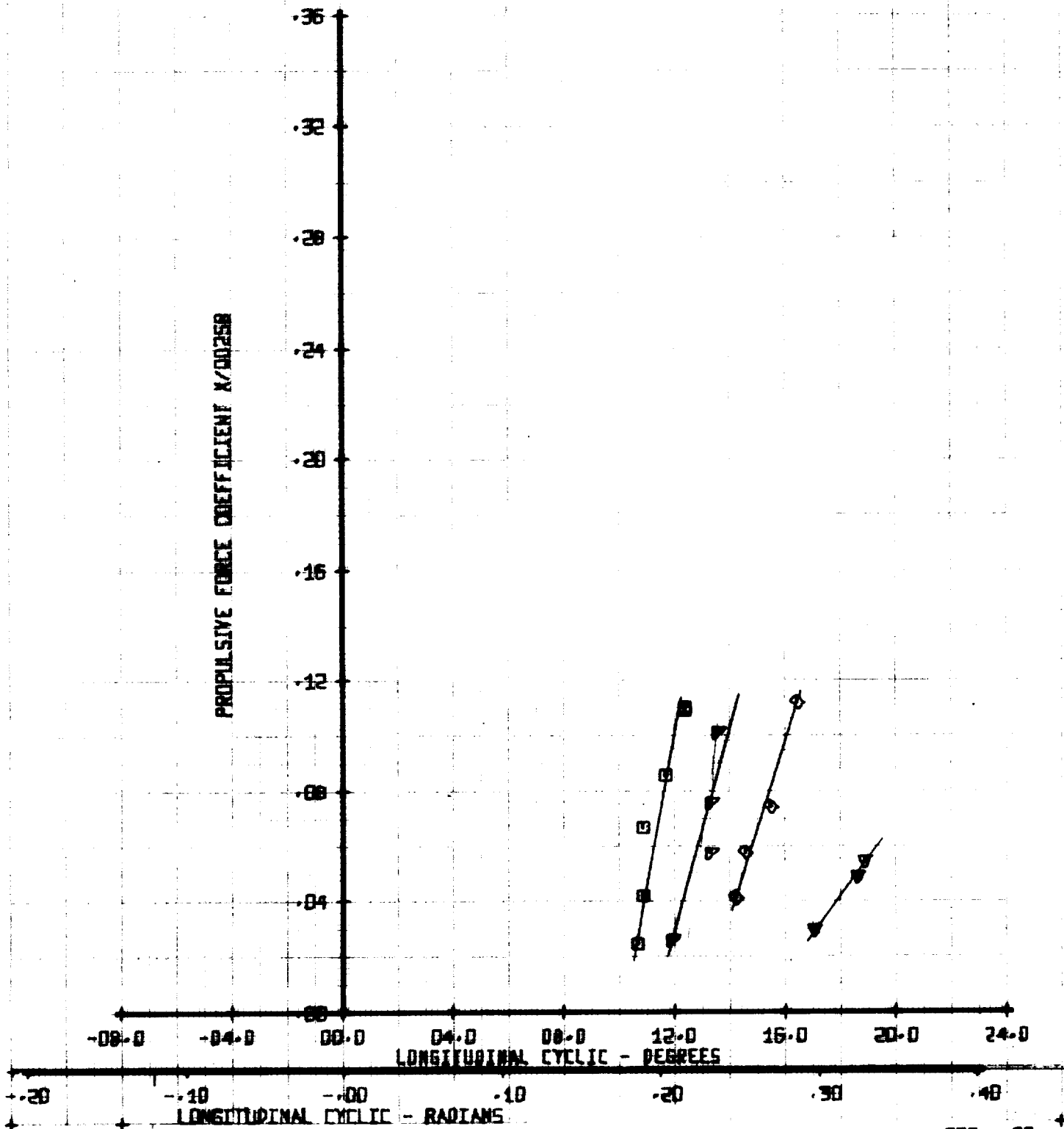


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	YTUN
□	269	.50	.05	311
◇	270	.50	.07	311
△	271	.50	.09	311
▽	272	.50	.10	311

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LONGITUDINAL CYCLIC

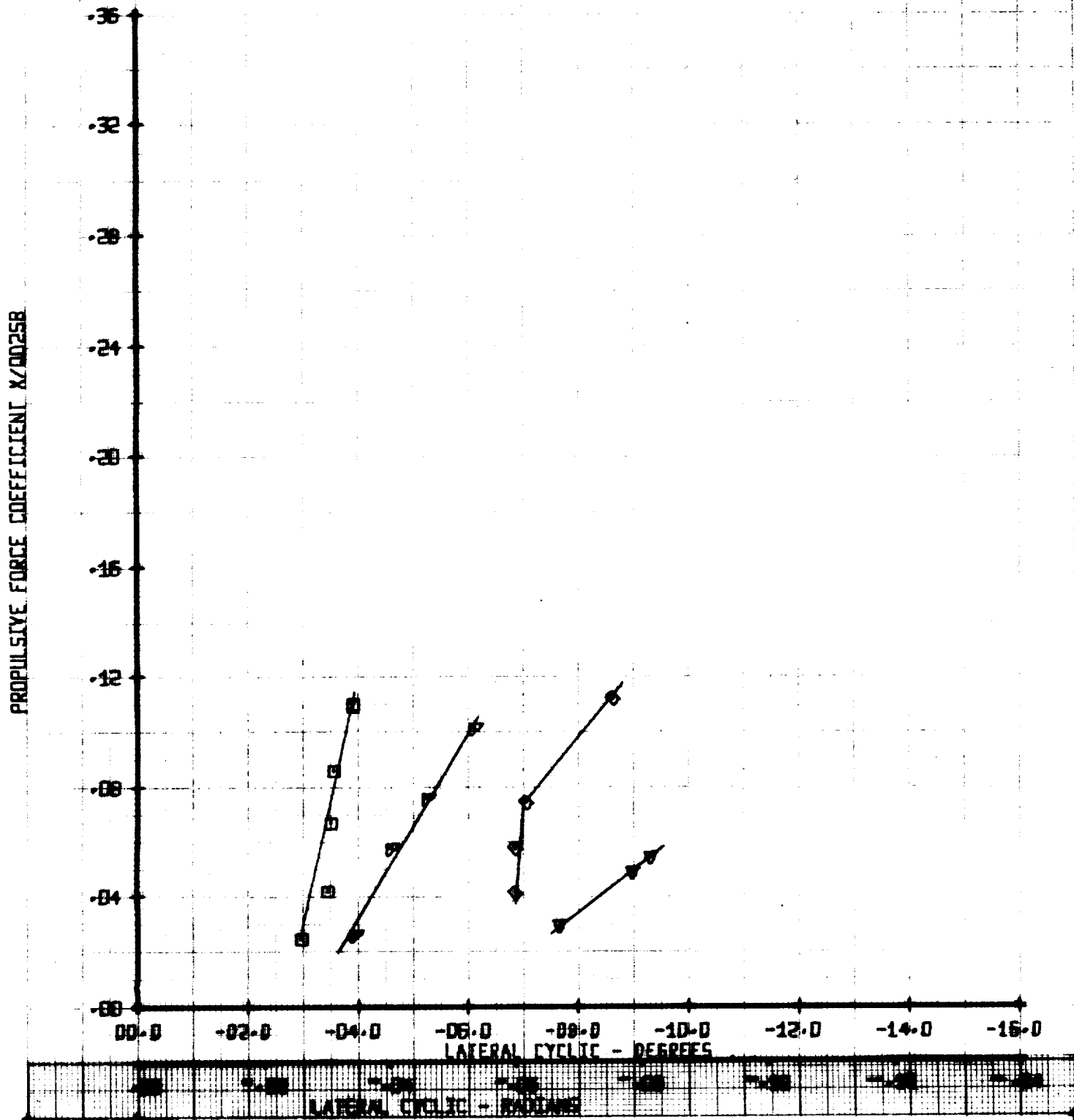


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT' / SB	YTDN
□	269	.50	.05	311
◇	270	.50	.07	311
◇	271	.50	.09	311
▼	272	.50	.10	311

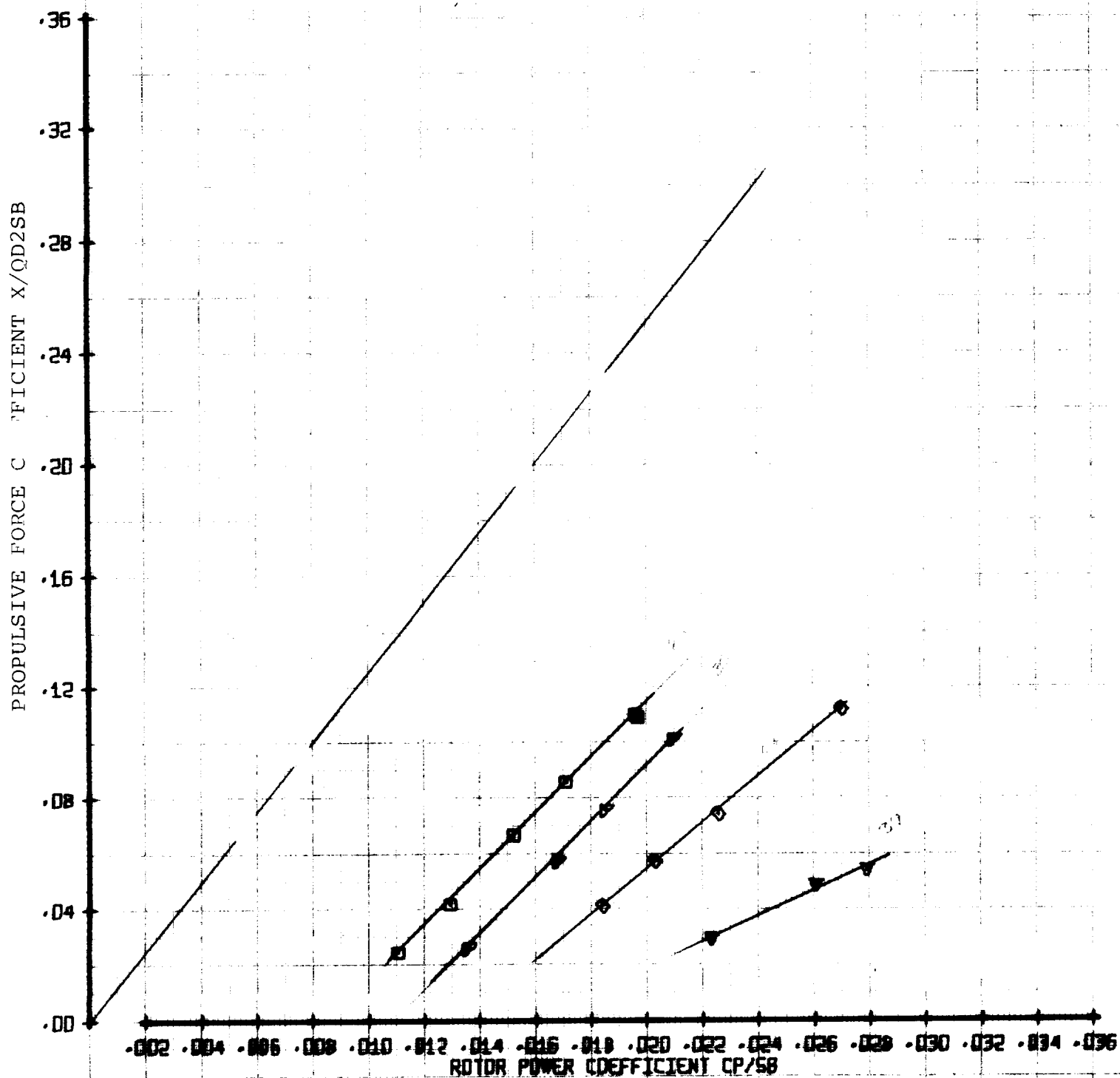
PROPULSIVE FORCE COEFFICIENT
VERSUS
LATERAL CYCLIC



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	MIN	MI'	CT'/58	VTUN
□	269	.50	.05	311
△	270	.50	.07	311
◇	271	.50	.09	311
▽	272	.50	.10	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT

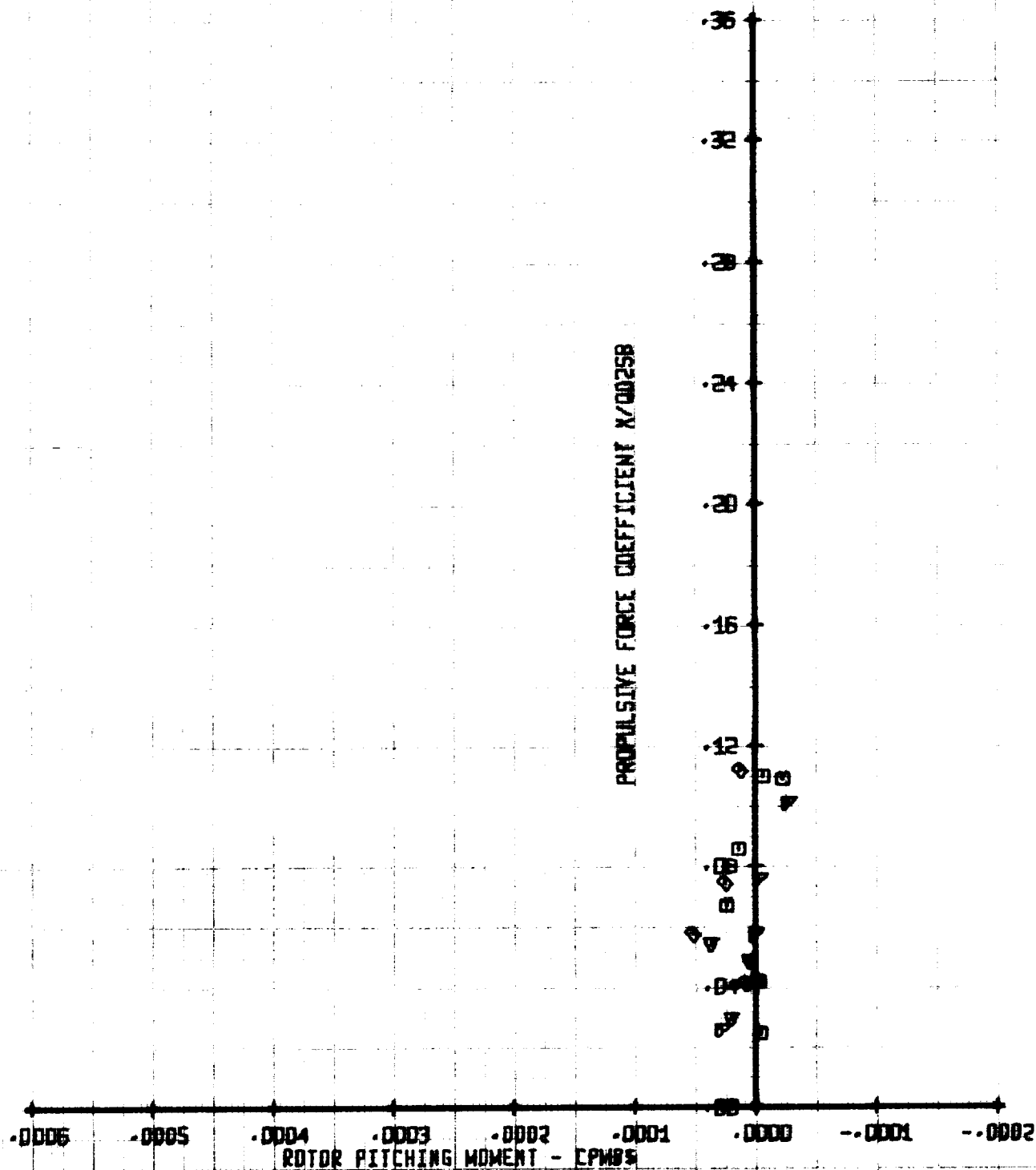


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT/58	VTUN
□	269	.50	.05	311
△	270	.50	.07	311
◇	271	.50	.09	311
▽	272	.50	.10	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

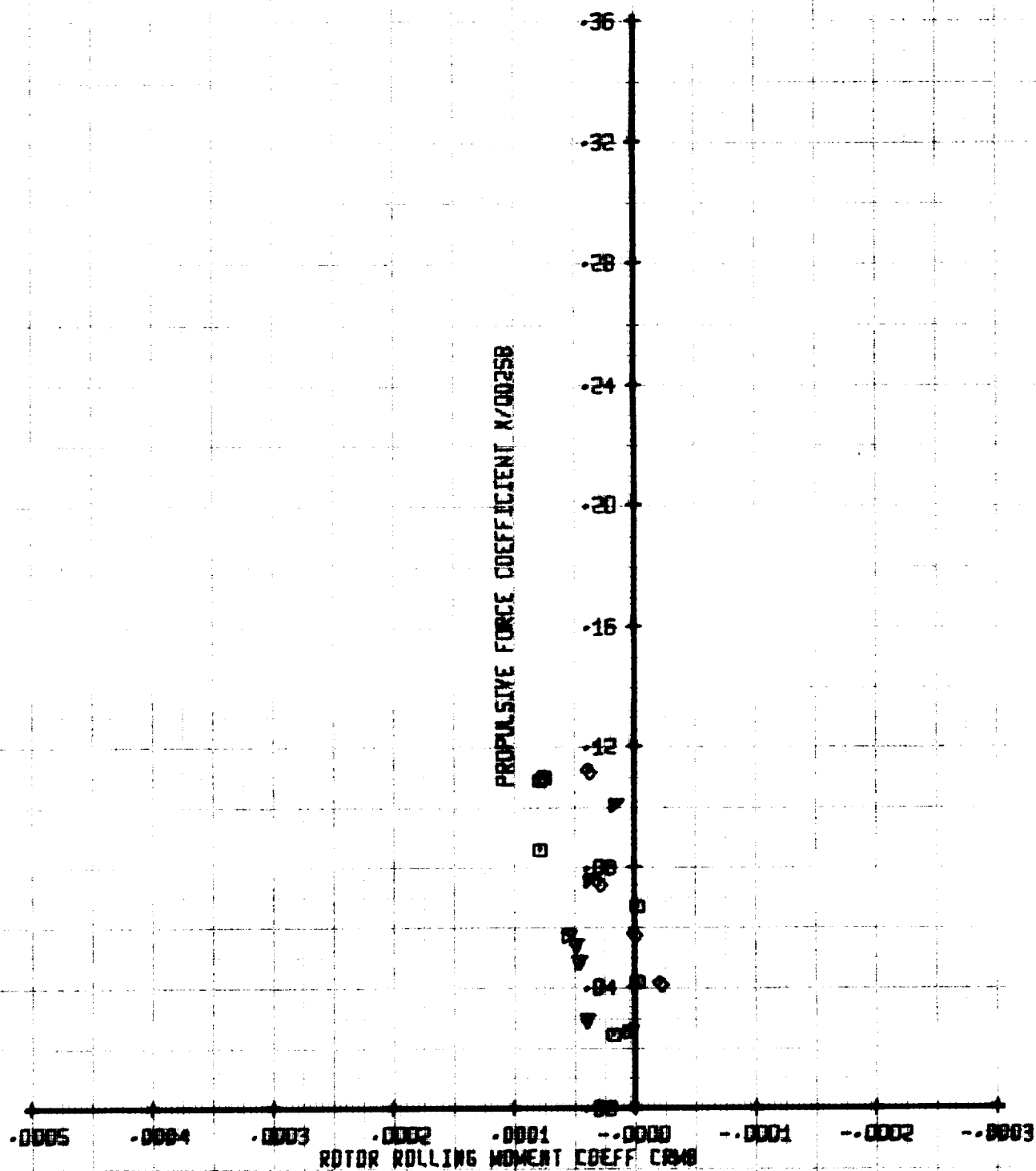


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	MIN	ML	CT'258	YTLN
□	269	.50	.05	311
△	270	.50	.07	311
◇	271	.50	.09	311
▽	272	.50	.10	

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT

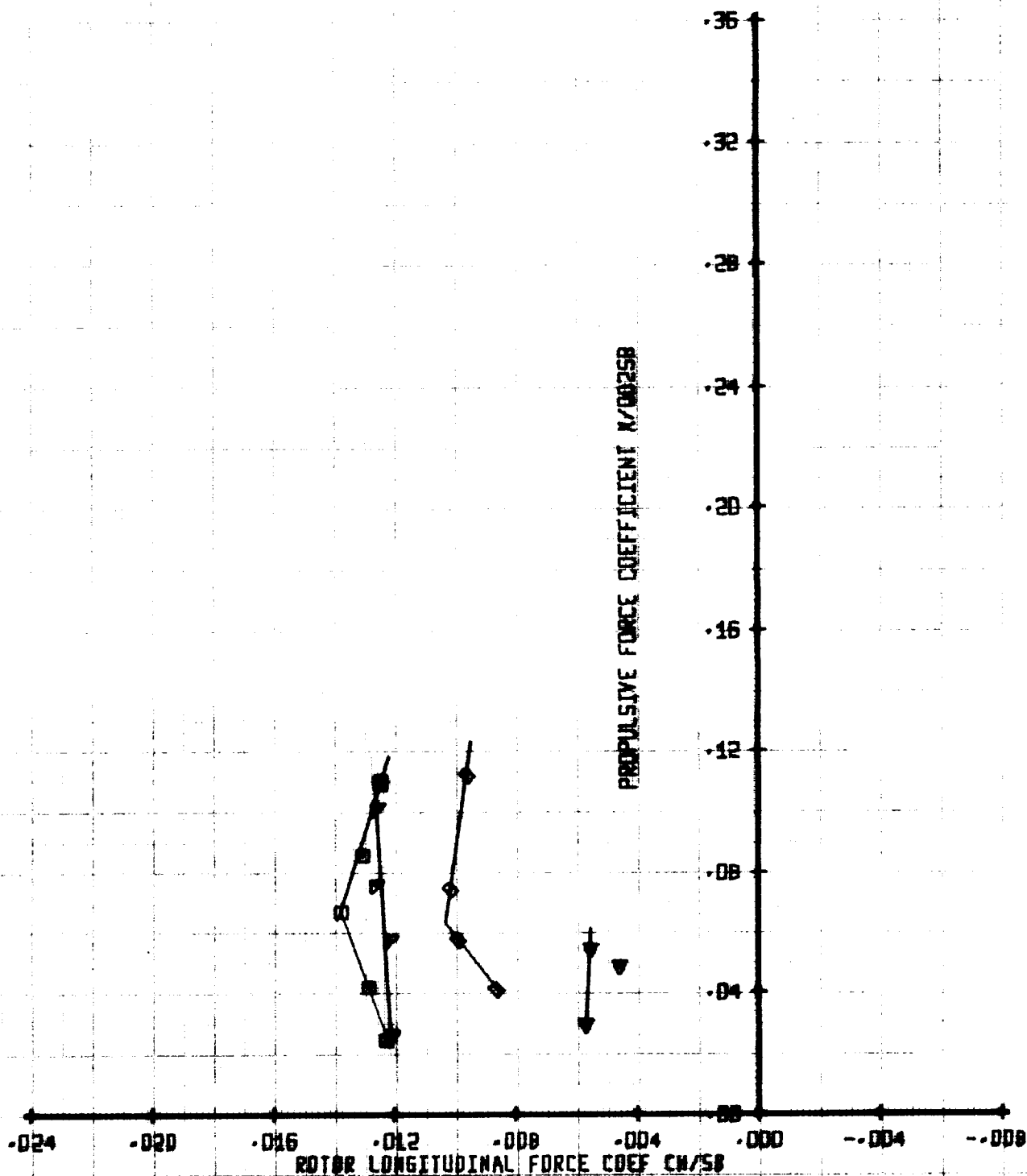


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'Y58	VTUM
○	269	.50	.05	311
◻	270	.50	.07	311
◊	271	.50	.08	311
▼	272	.50	.10	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT

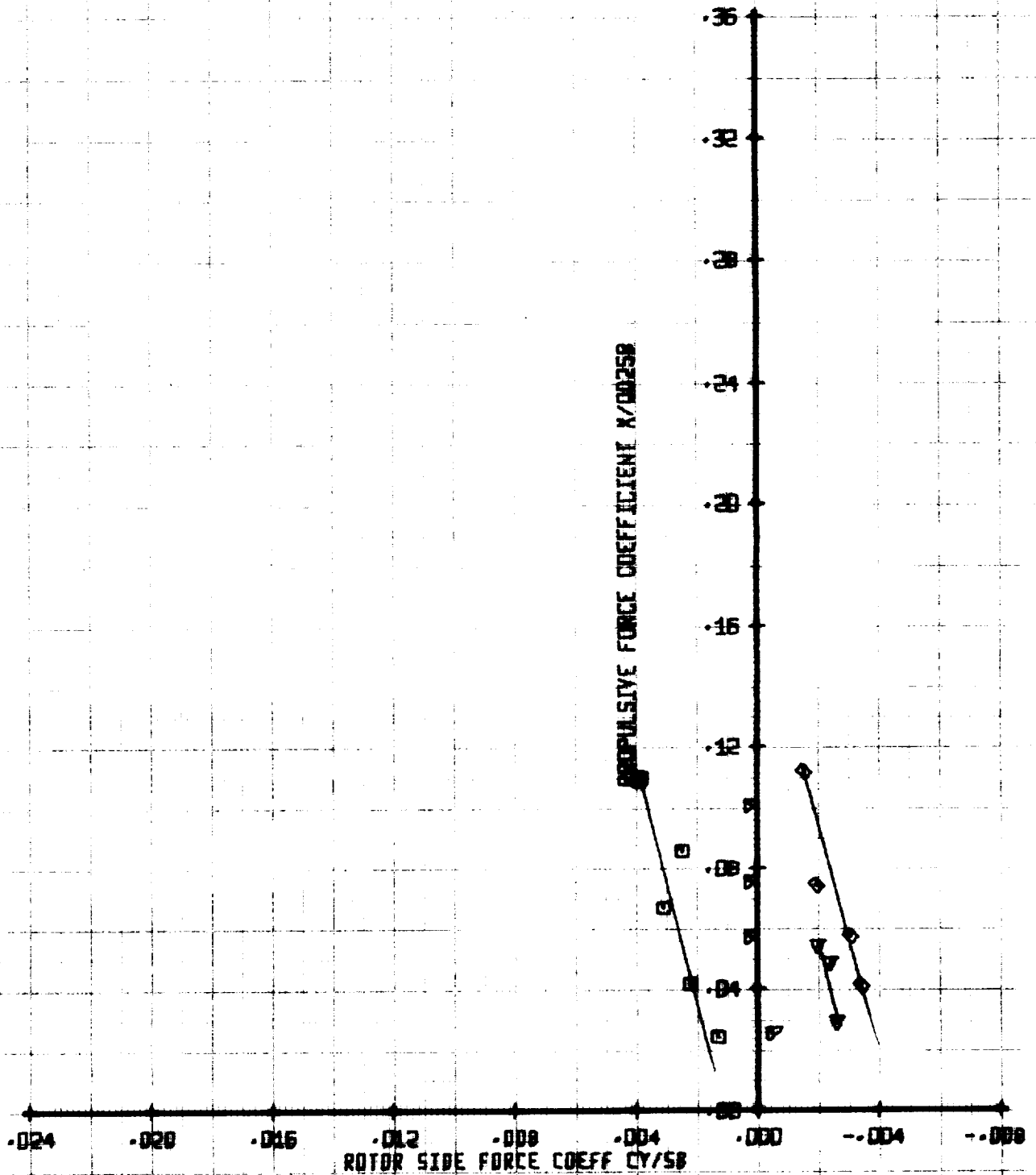


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT/58	YTLN
□	269	.50	.05	311
▤	270	.50	.07	311
◆	271	.50	.09	311
▼	272	.50	.10	311

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR SIDE FORCE COEFFICIENT

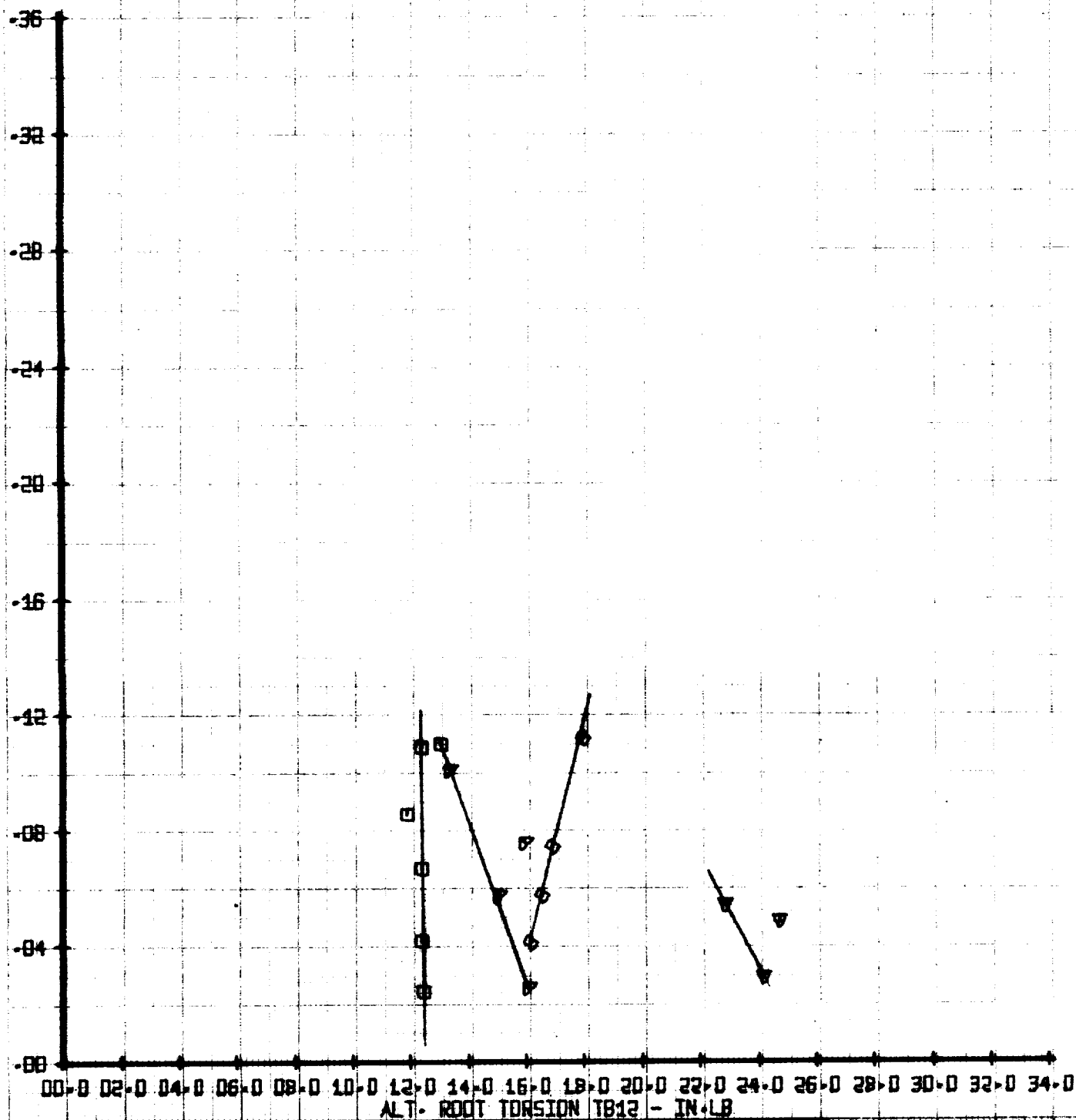


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MI'	CI' / 258	VTIN
□	269	.50	.05	311
▽	270	.50	.07	311
◆	271	.50	.09	311
▼	272	.50	.10	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

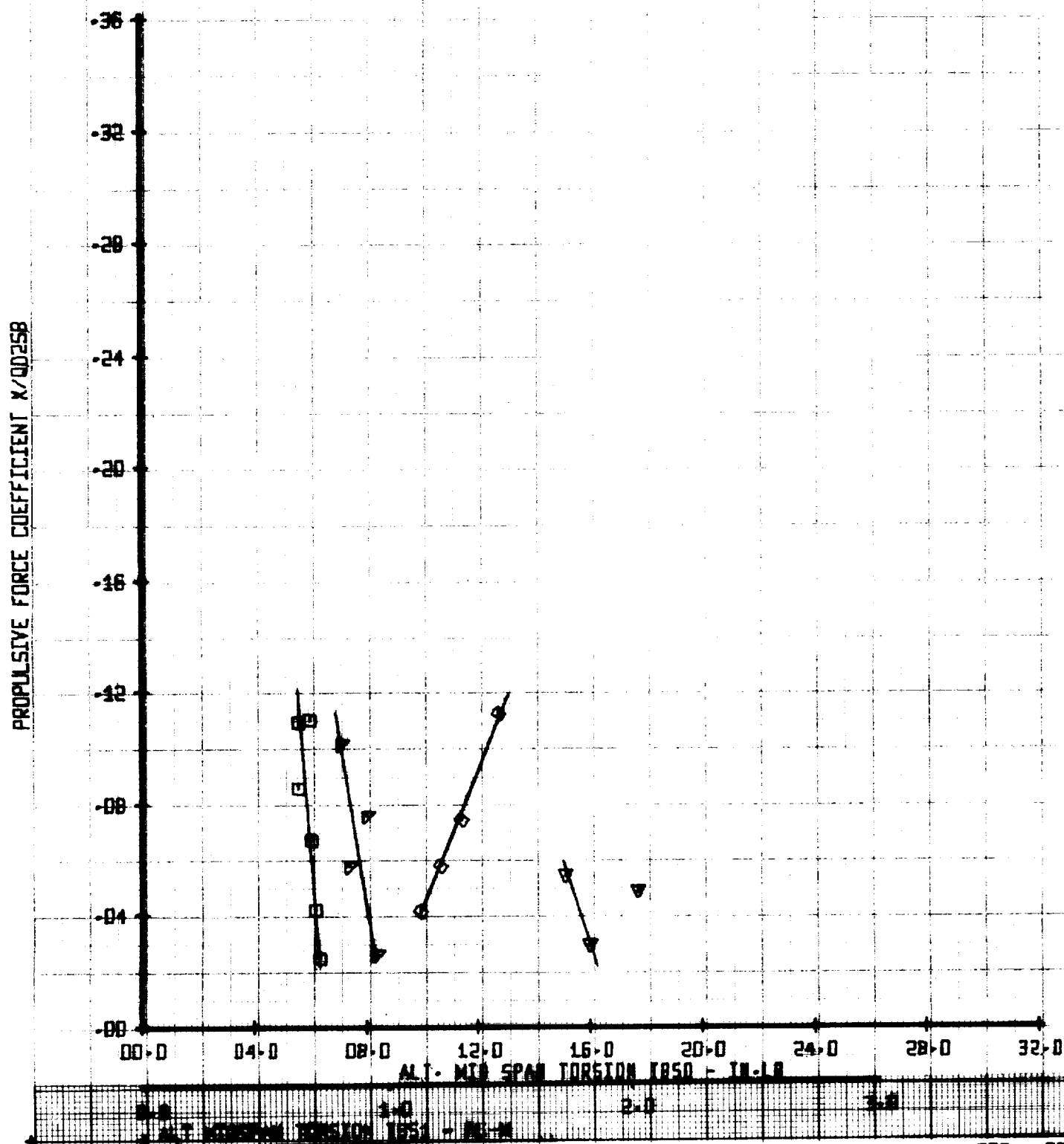
PROPULSIVE FORCE COEFFIC IT X/QD258



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	ML'	CT' / 50	VTUN
□	269	.50	.05	311
▽	270	.50	.07	311
◇	271	.50	.09	311
▼	272	.50	.10	311

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50

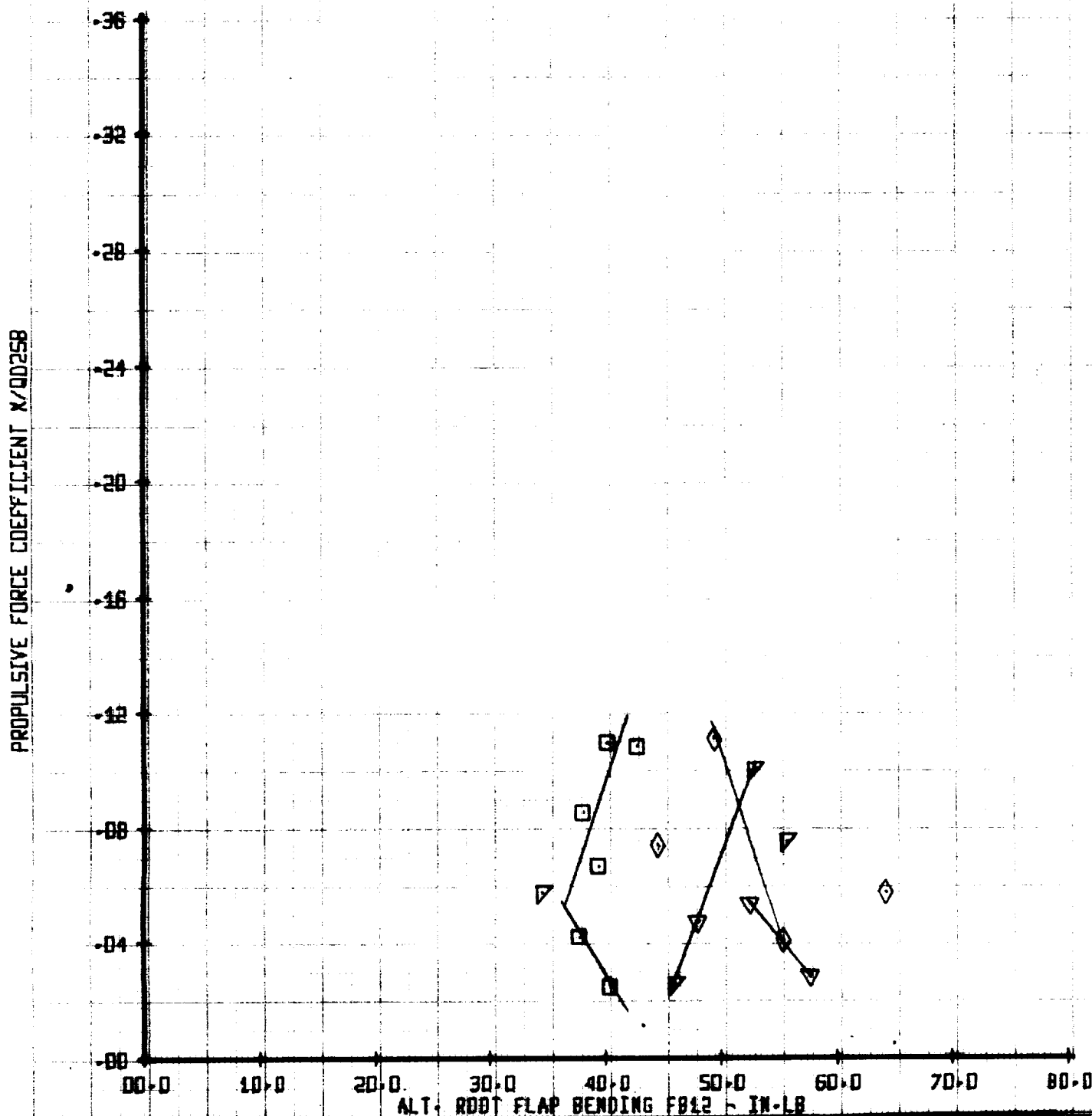


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / SB	VTUN
□	269	.50	.05	311
▽	270	.50	.07	311
◇	271	.50	.09	311
▽	272	.50	.10	

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

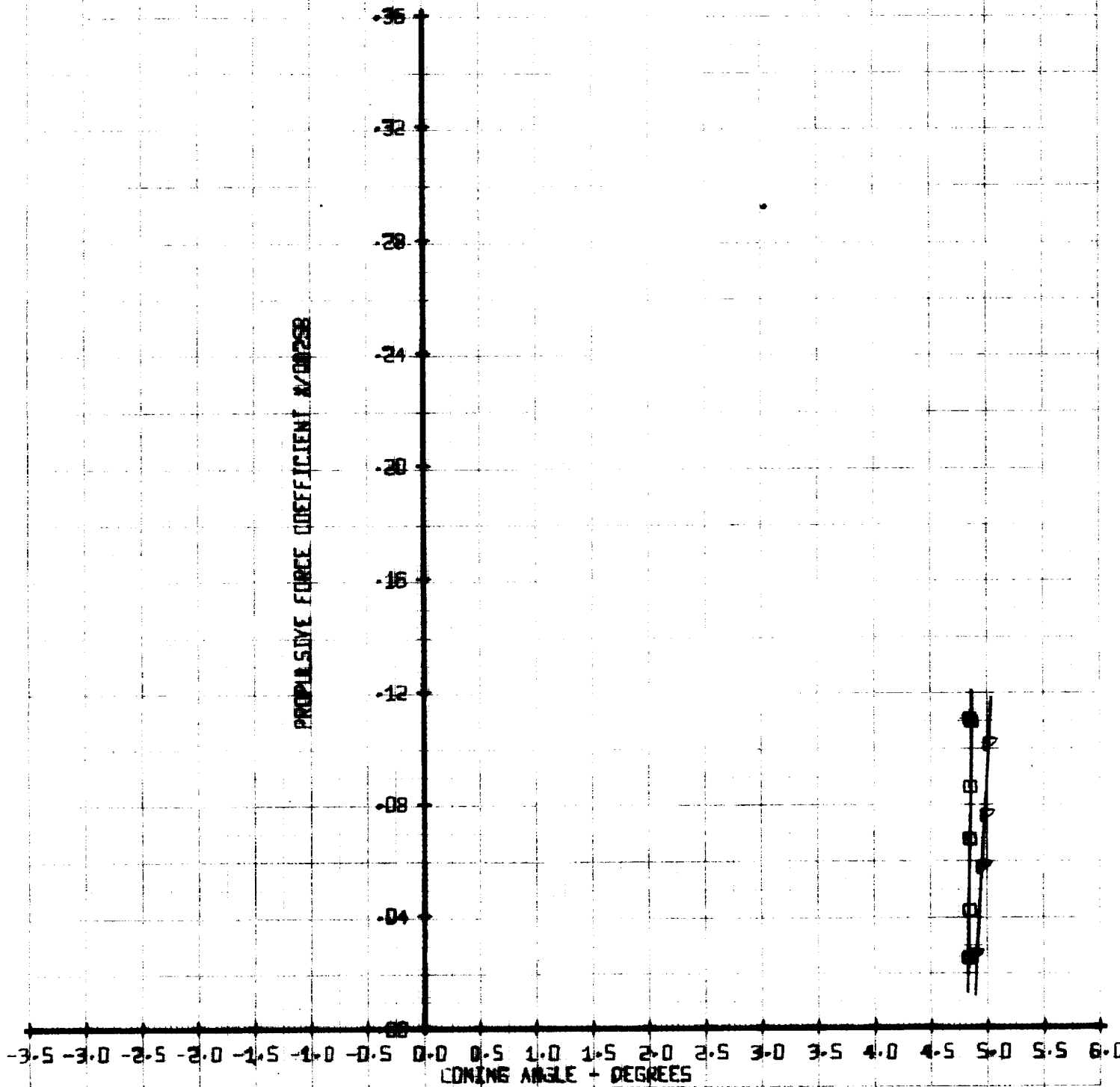


LEFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-17B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VILIN
□	269	.50	.05	311
◇	270	.50	.07	311
△	271	.50	.09	311
▽	272	.50	.10	311

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 CONING ANGLE

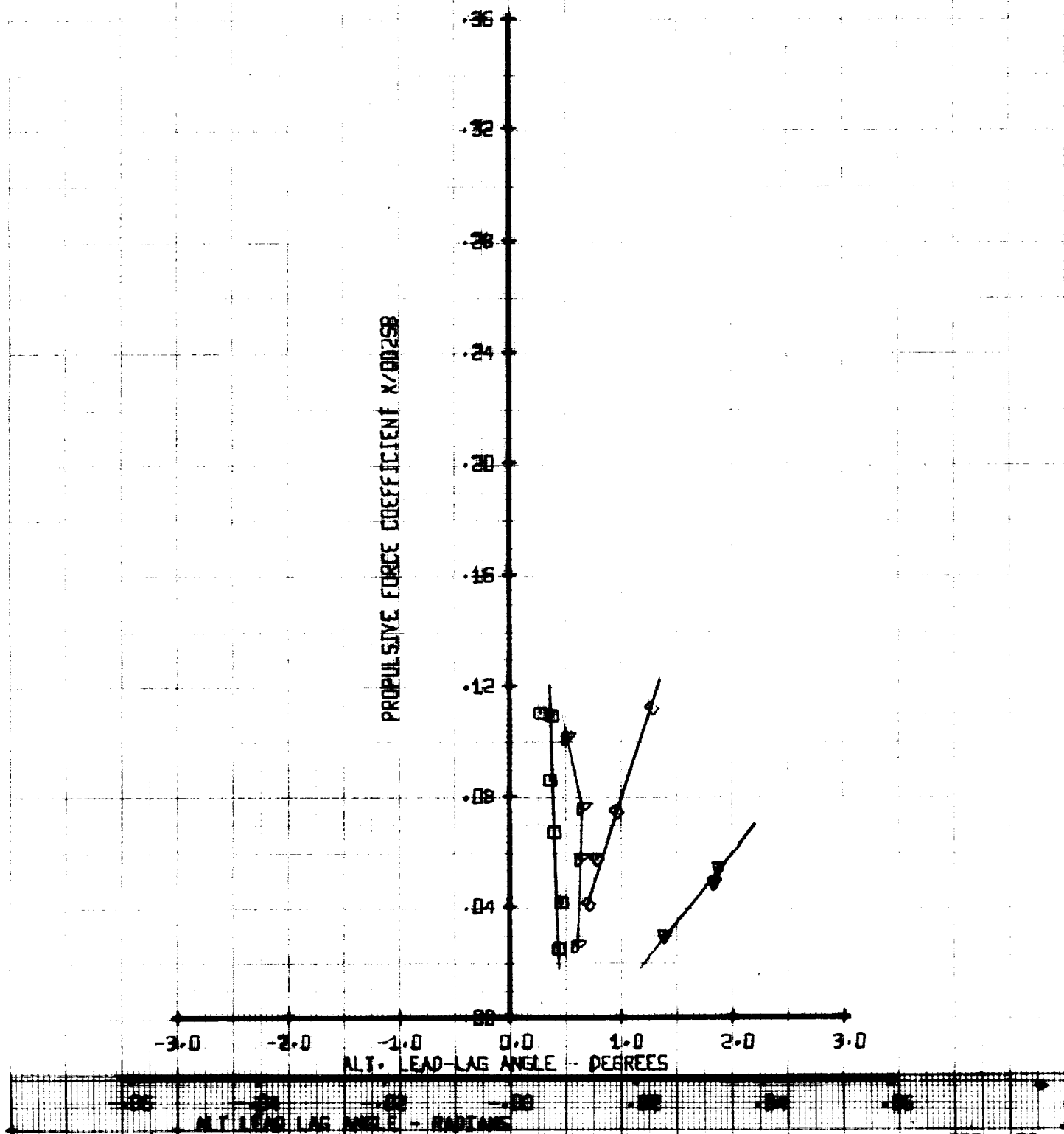


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	BLM	MU'	CT' / SB	VTUM
□	269	.50	.05	31.1
△	270	.50	.07	31.1
◇	271	.50	.09	31.1
▽	272	.50	.10	31.1

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE

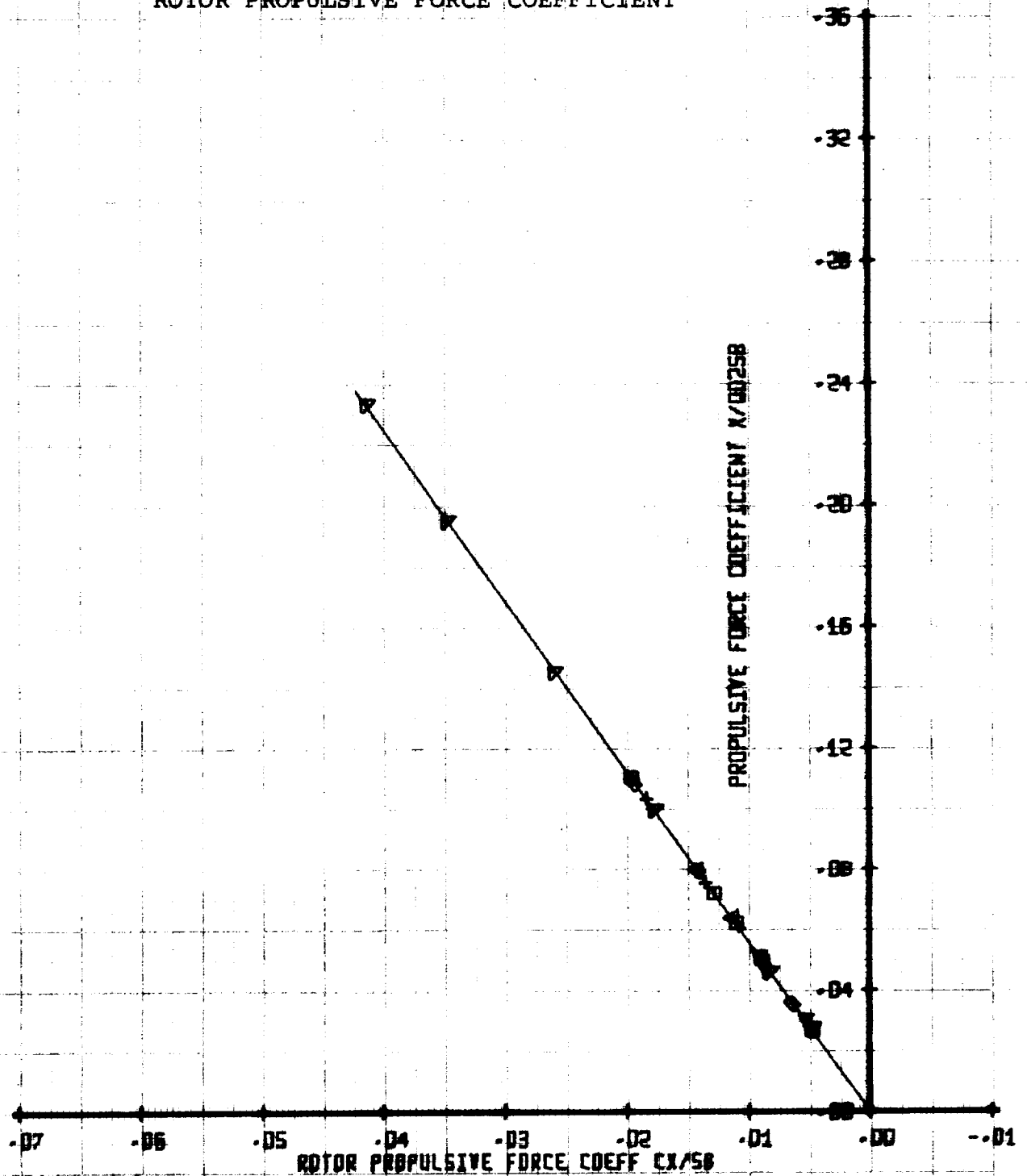


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	M1'	CT'58	VTUM
+	268	.53	.05	328
+	240	.53	.06	328
+	266	.53	.06	328
+	241	.53	.09	328
+	242	.53	.09	328
+	267	.53	.10	328

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR PROPULSIVE FORCE COEFFICIENT

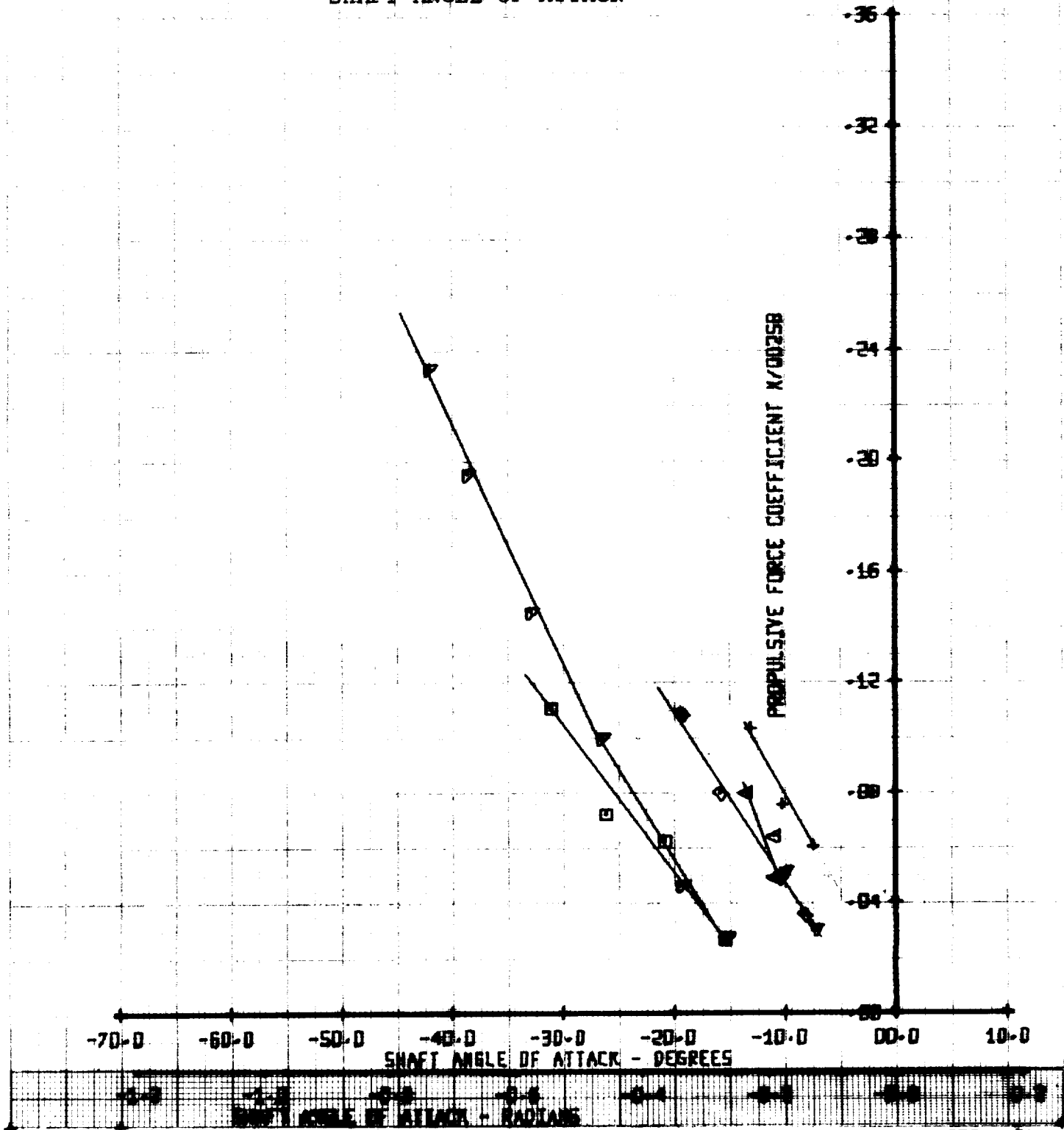


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/58	VTUN
○	258	.53	.05	328
□	240	.53	.06	328
△	256	.53	.08	328
+	241	.53	.09	328
	242	.53	.09	328
	267	.53	.10	328

PROPULSIVE FORCE COEFFICIENT
VERSUS
SHAFT ANGLE OF ATTACK

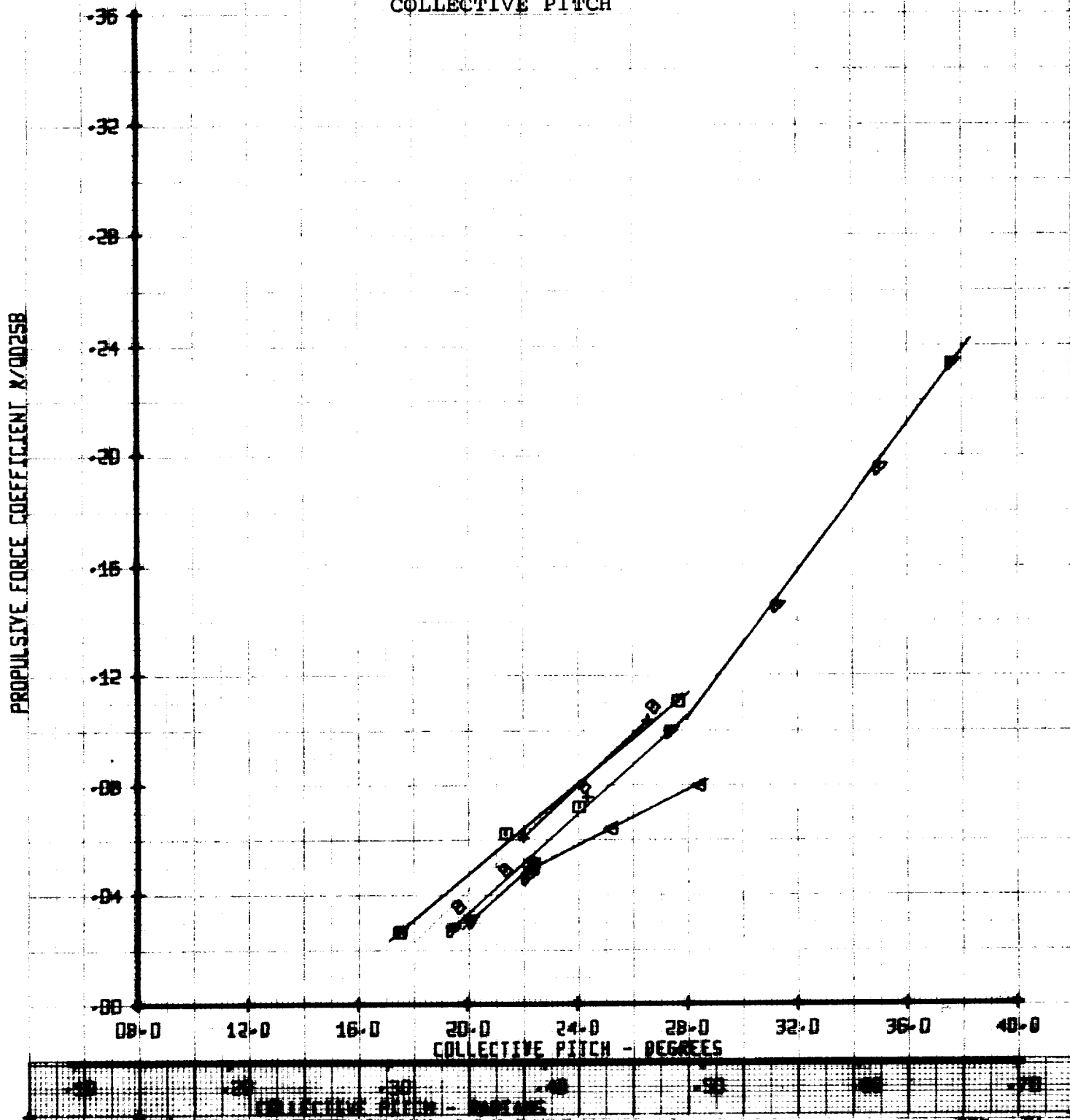


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT'58	Y10N
○	260	.53	.05	320
□	240	.53	.06	320
◇	266	.53	.08	320
△	241	.53	.09	320
+	242	.53	.09	320
	267	.53	.10	320

PROPULSIVE FORCE COEFFICIENT
VERSUS
COLLECTIVE PITCH

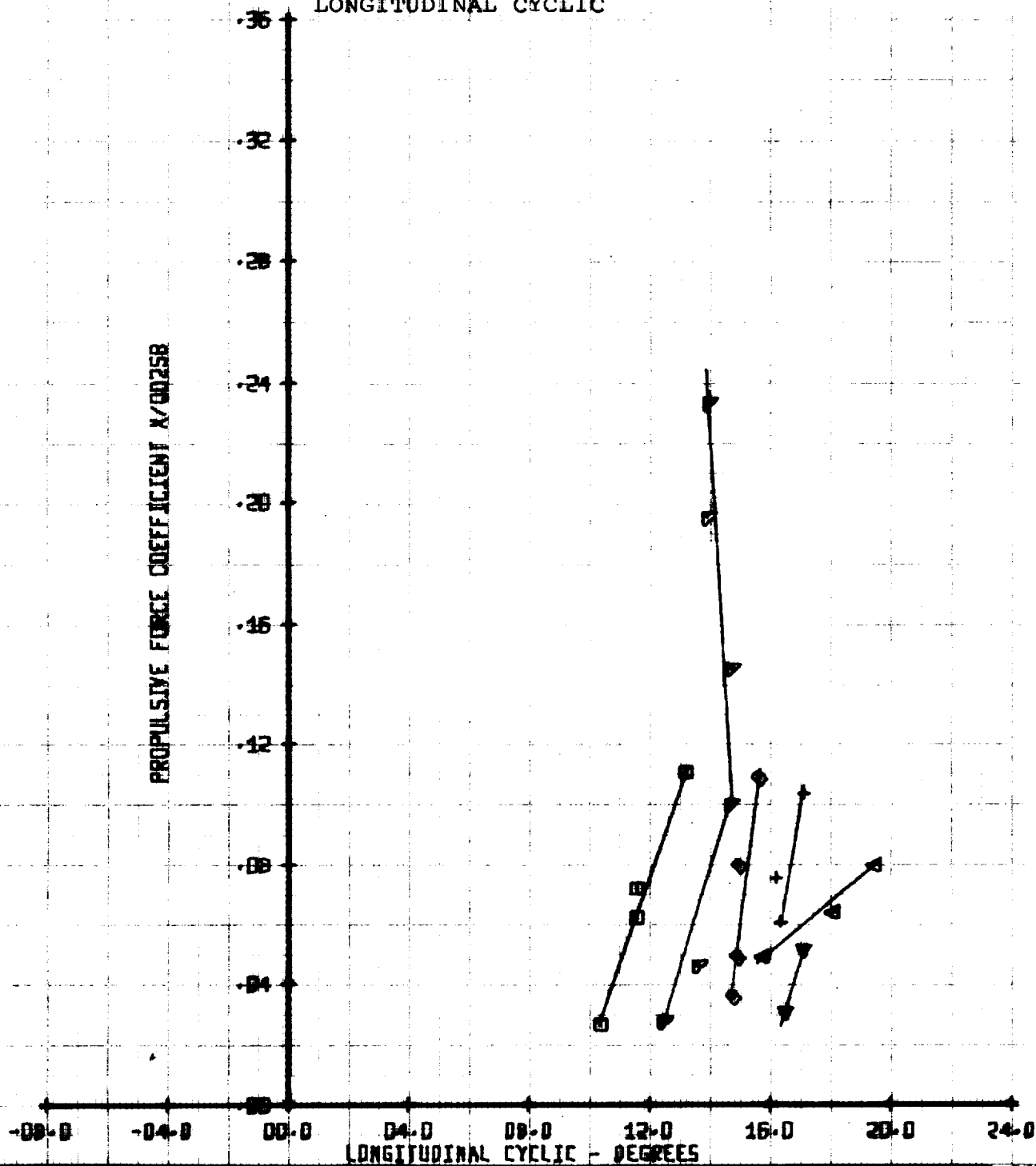


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MI'	CT'/SB	YTLIN
□	260	.53	.05	320
△	240	.53	.06	320
◇	266	.53	.08	320
▽	241	.53	.09	320
+	242	.53	.09	320
+	267	.53	.10	320

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LONGITUDINAL CYCLIC

PROPULSIVE FORCE COEFFICIENT X/00258

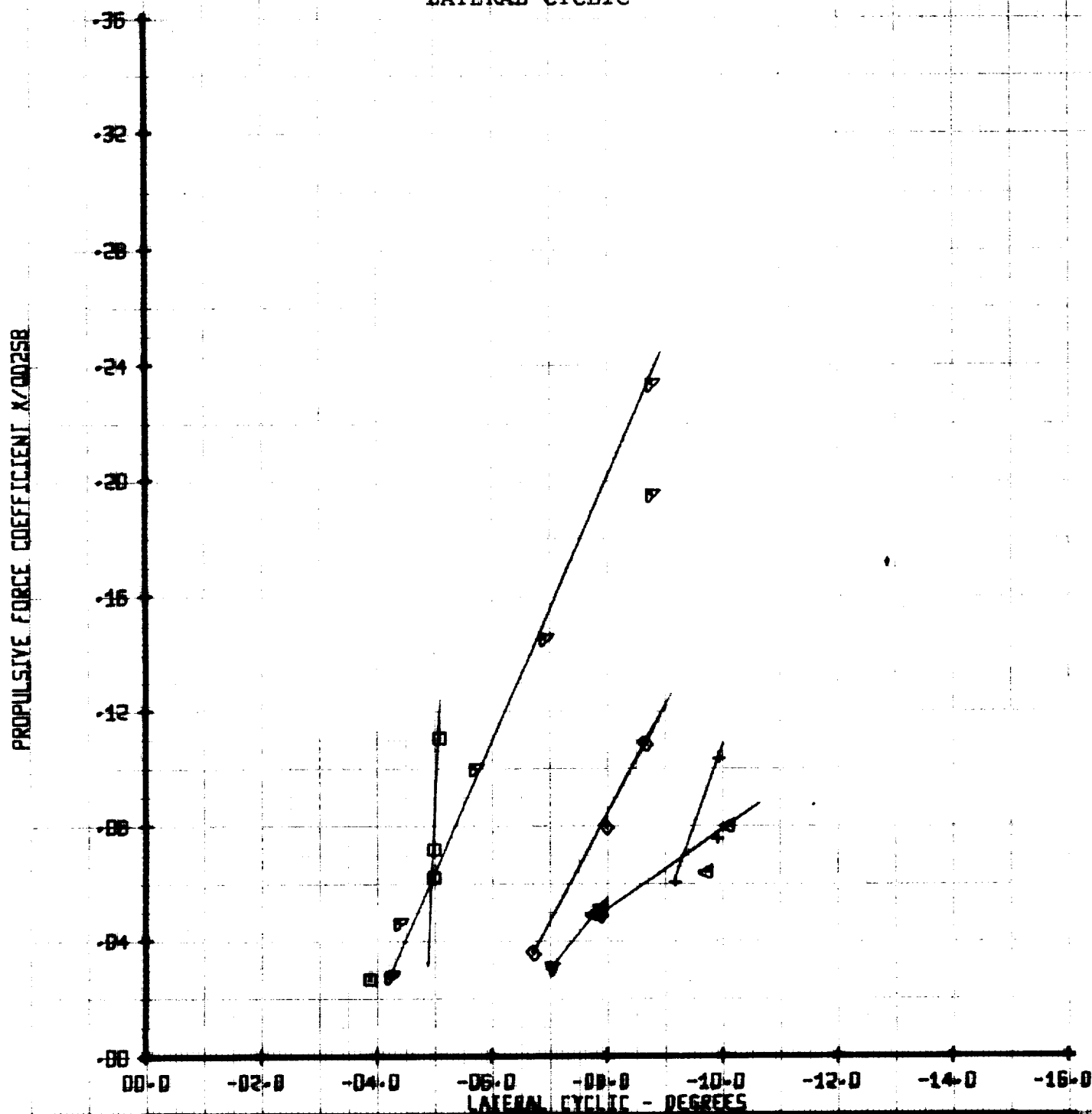


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT'/58	YTDN
□	268	.53	.05	328
◇	240	.53	.06	328
◇	266	.53	.06	328
△	241	.53	.09	328
△	242	.53	.09	328
+	267	.53	.10	328

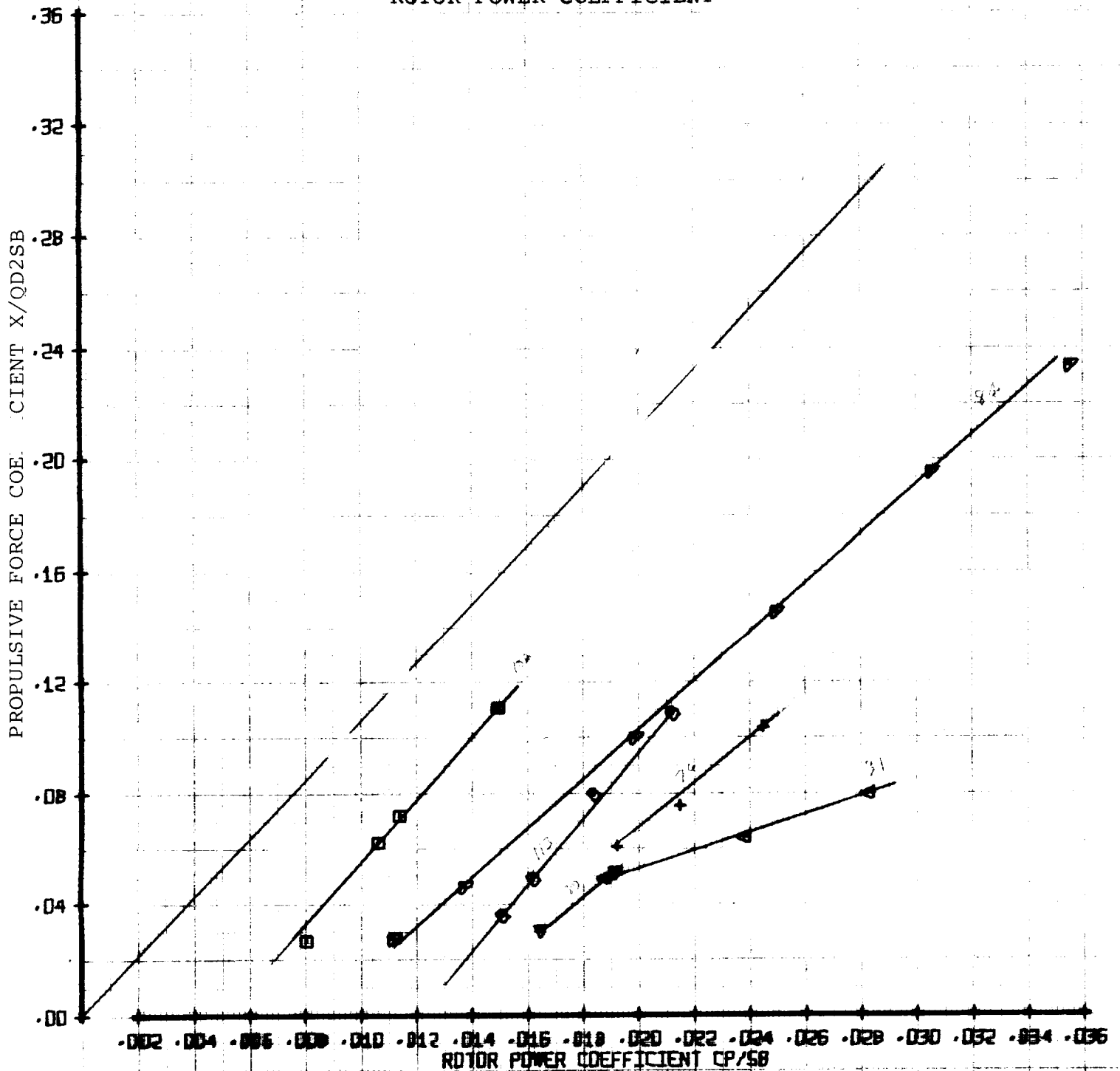
PROPULSIVE FORCE COEFFICIENT
VERSUS
LATERAL CYCLIC



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MI'	CT'/58	YTLIN
□	268	.53	.05	320
◇	240	.53	.06	320
◆	266	.53	.08	320
▲	241	.53	.09	320
△	242	.53	.09	320
+	267	.53	.10	320

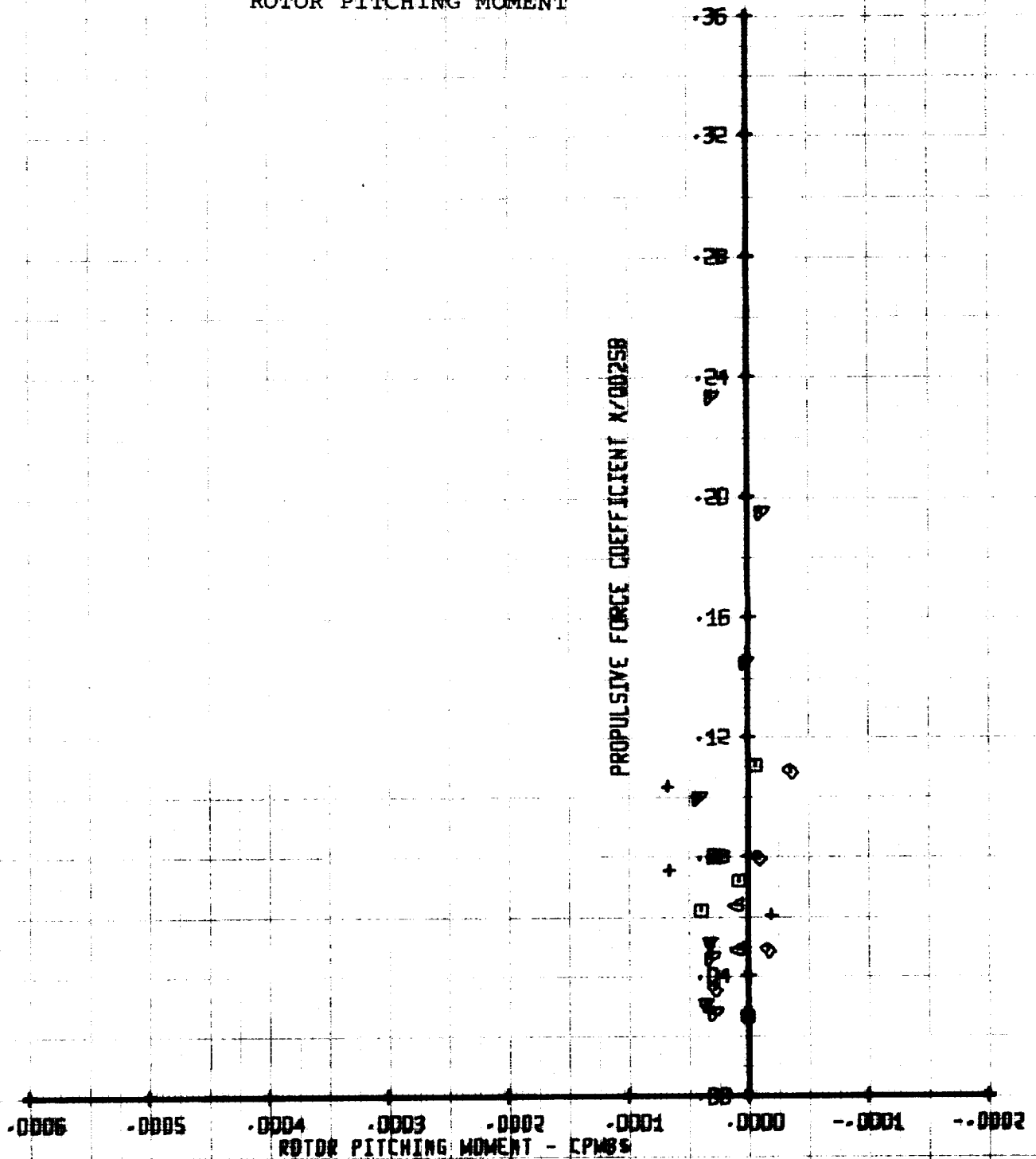
PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MU'	CT'/SB	VTUN
+	260	.53	.05	320
Δ	240	.53	.06	320
◊	266	.53	.06	320
□	241	.53	.09	320
	242	.53	.09	320
	267	.53	.10	320

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

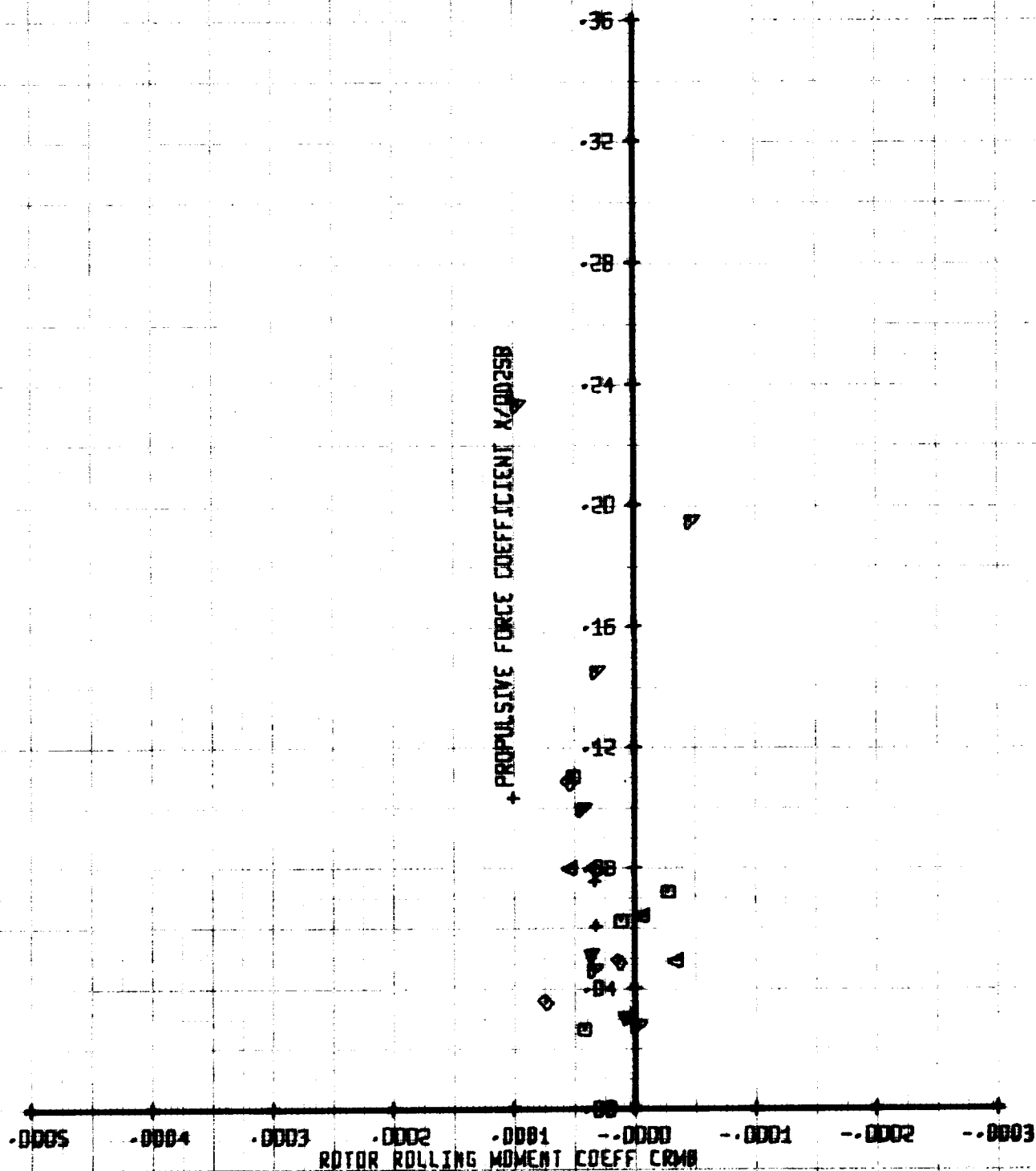


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'Y5B	VTUN
	268	.53	.05	328
	240	.53	.06	328
	266	.53	.08	328
	241	.53	.09	328
	242	.53	.09	328
	267	.53	.10	328

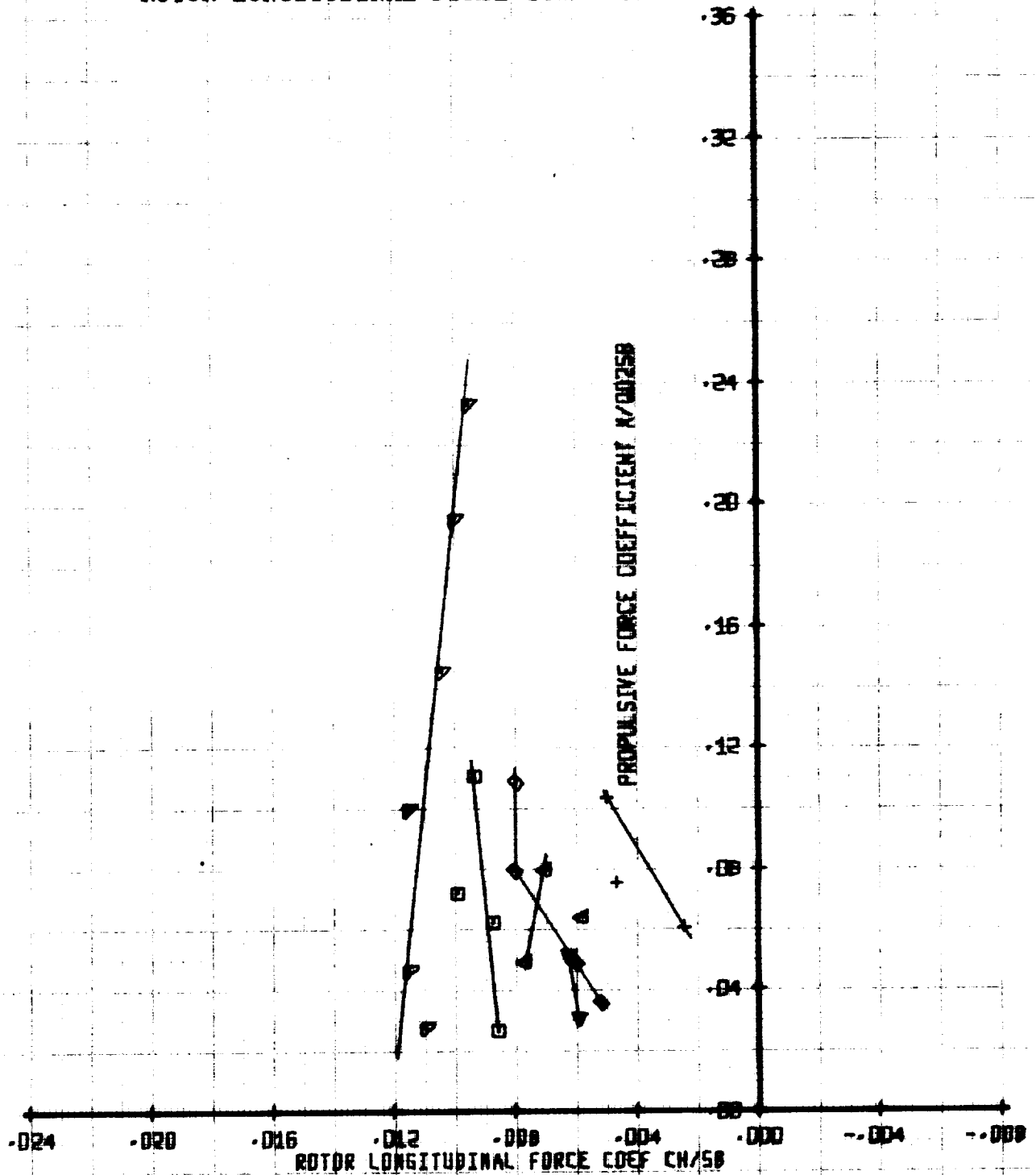
PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MU'	CT' / 58	VTUN
○	268	.53	.05	328
□	240	.53	.06	328
◇	266	.53	.08	328
△	241	.53	.09	328
+	242	.53	.09	328
+	267	.53	.10	328

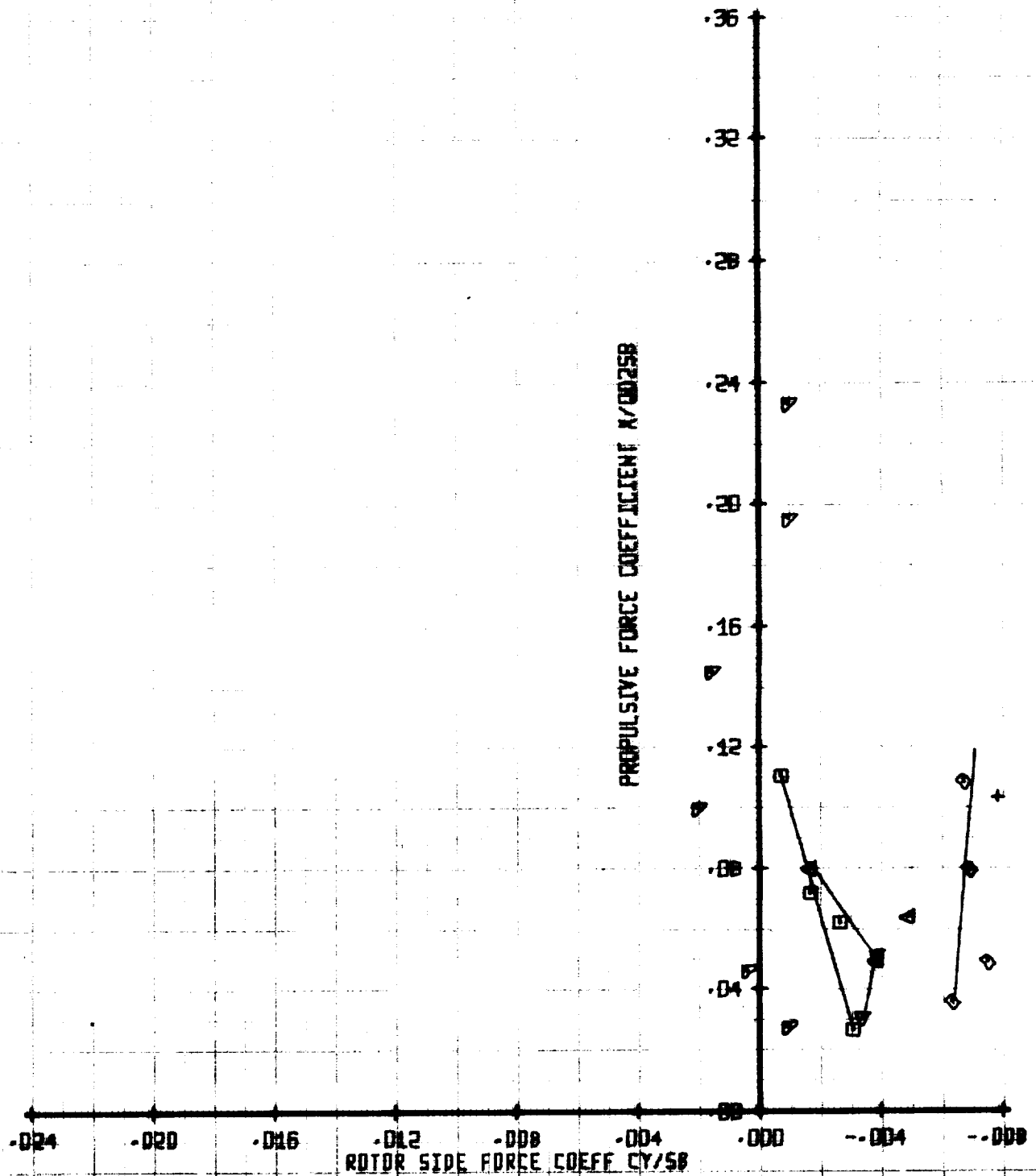
PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR LONGITUDINAL FORCE COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MU'	CT'/SB	VTUM
□	268	.53	.05	328
◇	240	.53	.06	328
△	266	.53	.08	328
▽	241	.53	.09	328
+	242	.53	.09	328
+	267	.53	.10	328

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT



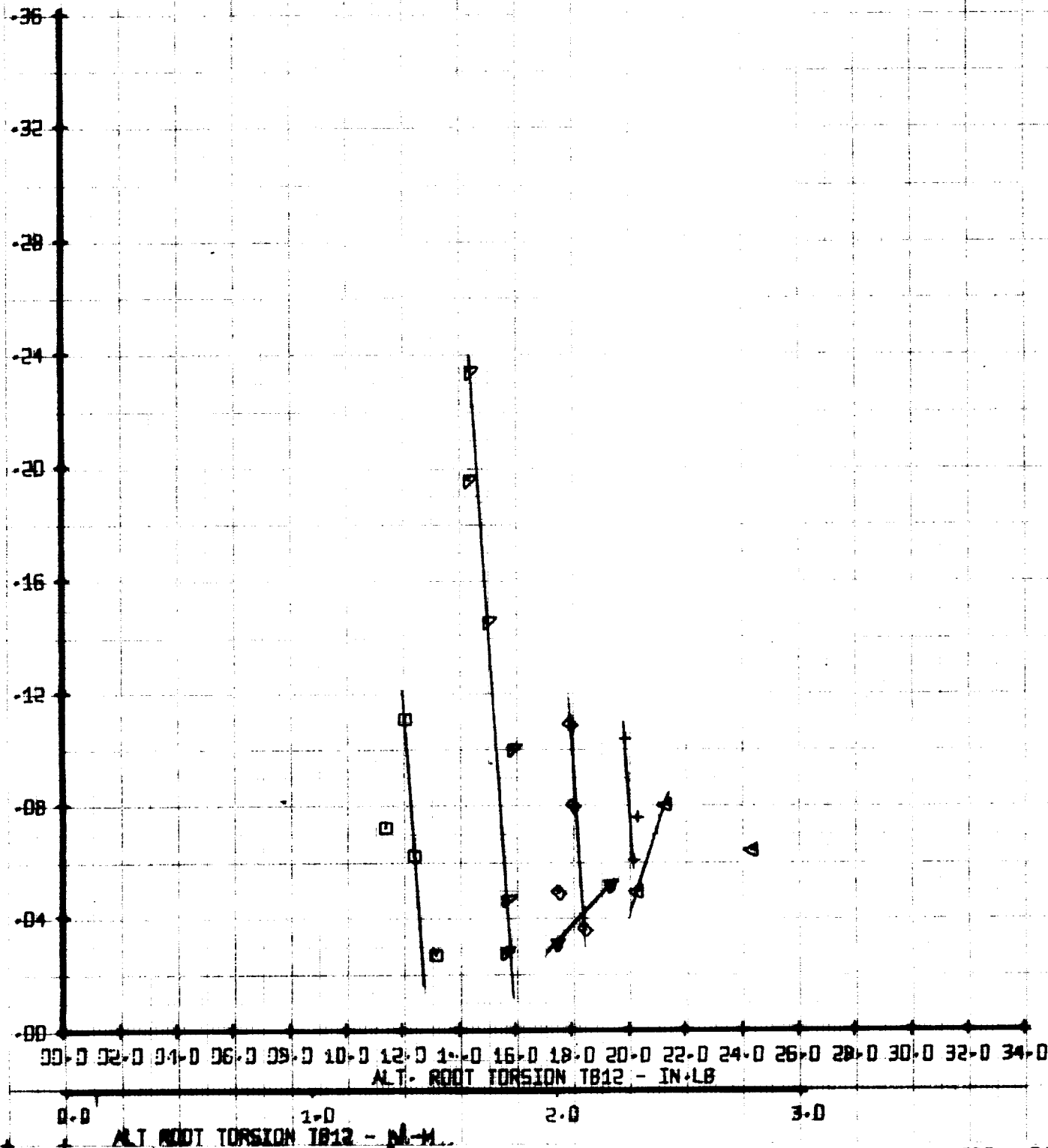
LIFT-PROPULSIVE FORCE LIMIT TEST
 1210 SCALE CM 173 ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	WET	CT/58	VTUN
□	269	0.05	0.05	328
△	243	0.06	0.06	328
◇	260	0.08	0.08	328
+	241	0.09	0.09	328
×	242	0.09	0.09	328
•	267	0.10	0.10	328

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING ROOT TORSION TB12

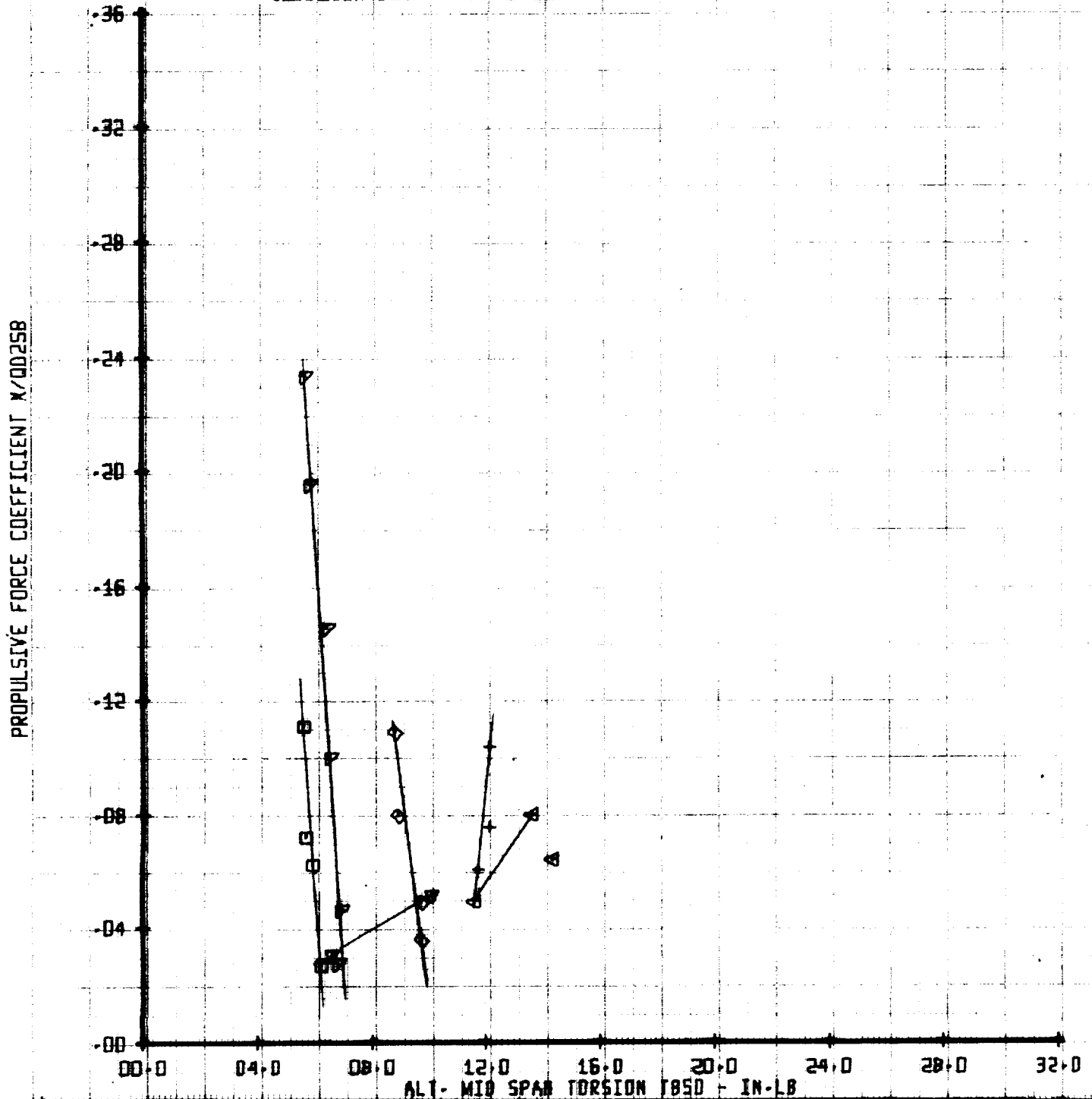
PROPULSIVE FORCE COEFFIC IT X/00258



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	ML'	CT' / SB	VTUN
□	268	.53	.05	328
▽	240	.53	.06	328
◇	266	.53	.08	328
△	241	.53	.09	328
+	242	.53	.09	328
+	267	.53	.10	328

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50

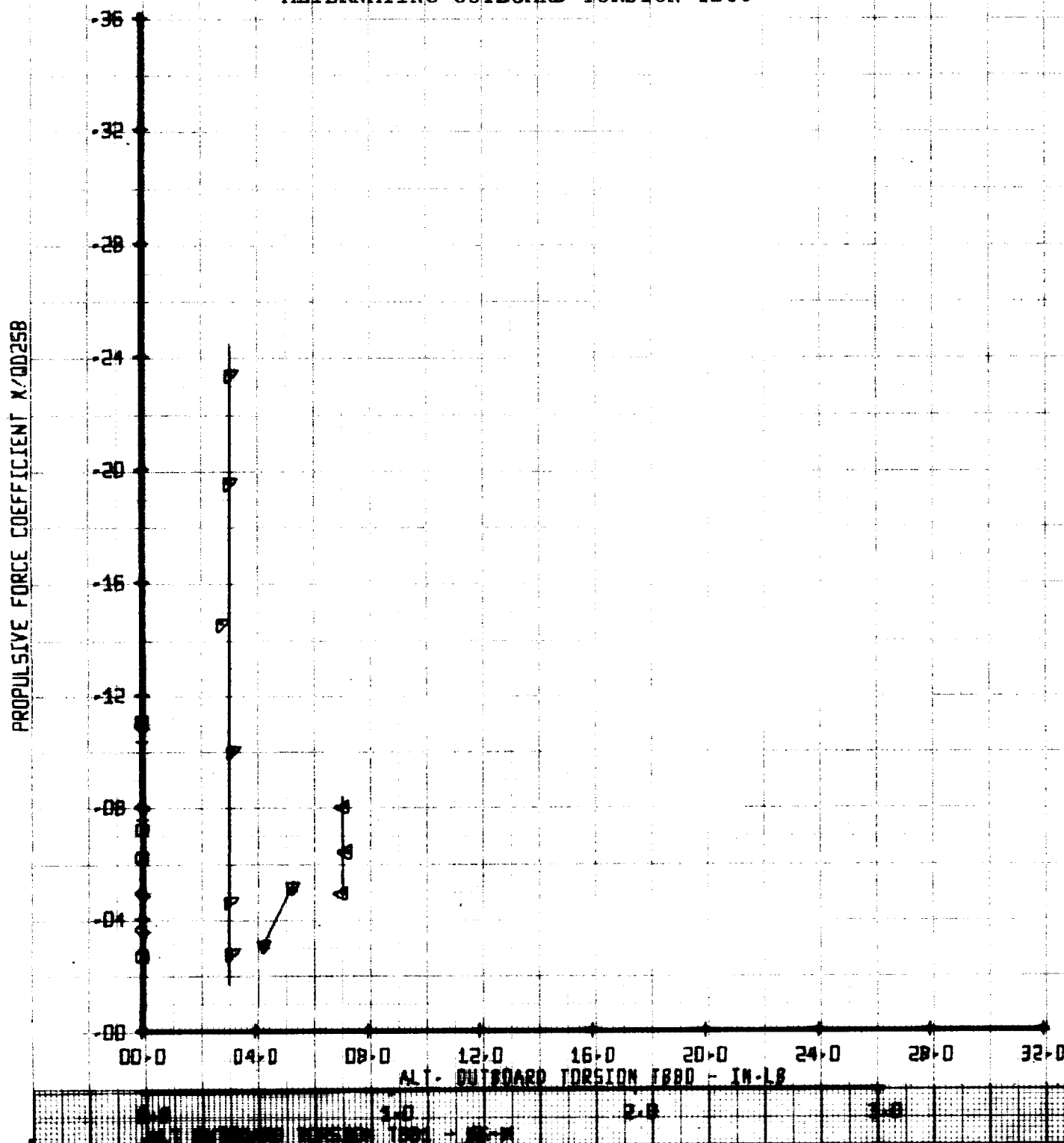


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT' / 50	VTUN
○	268	.53	.05	320
△	240	.53	.06	320
◇	266	.53	.08	320
▽	241	.53	.09	320
+	242	.53	.09	320
×	267	.53	.10	320

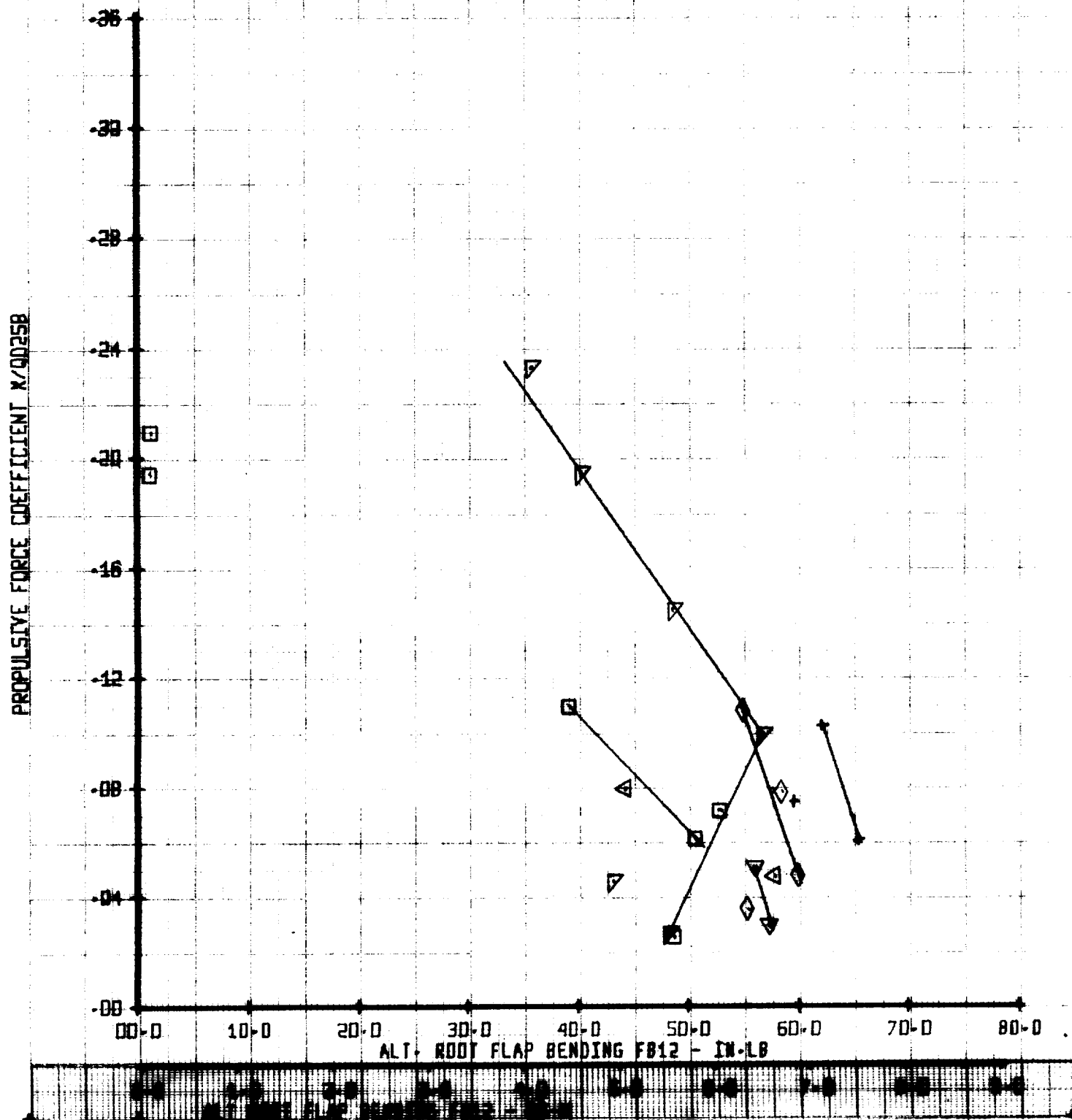
PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING OUTBOARD TORSION TB80



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	ML'	CT' / 58	VTUN
□	258	.53	.05	328
▽	240	.53	.06	328
◇	256	.53	.08	328
△	241	.53	.09	328
△	242	.53	.09	328
+	267	.53	.10	328

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

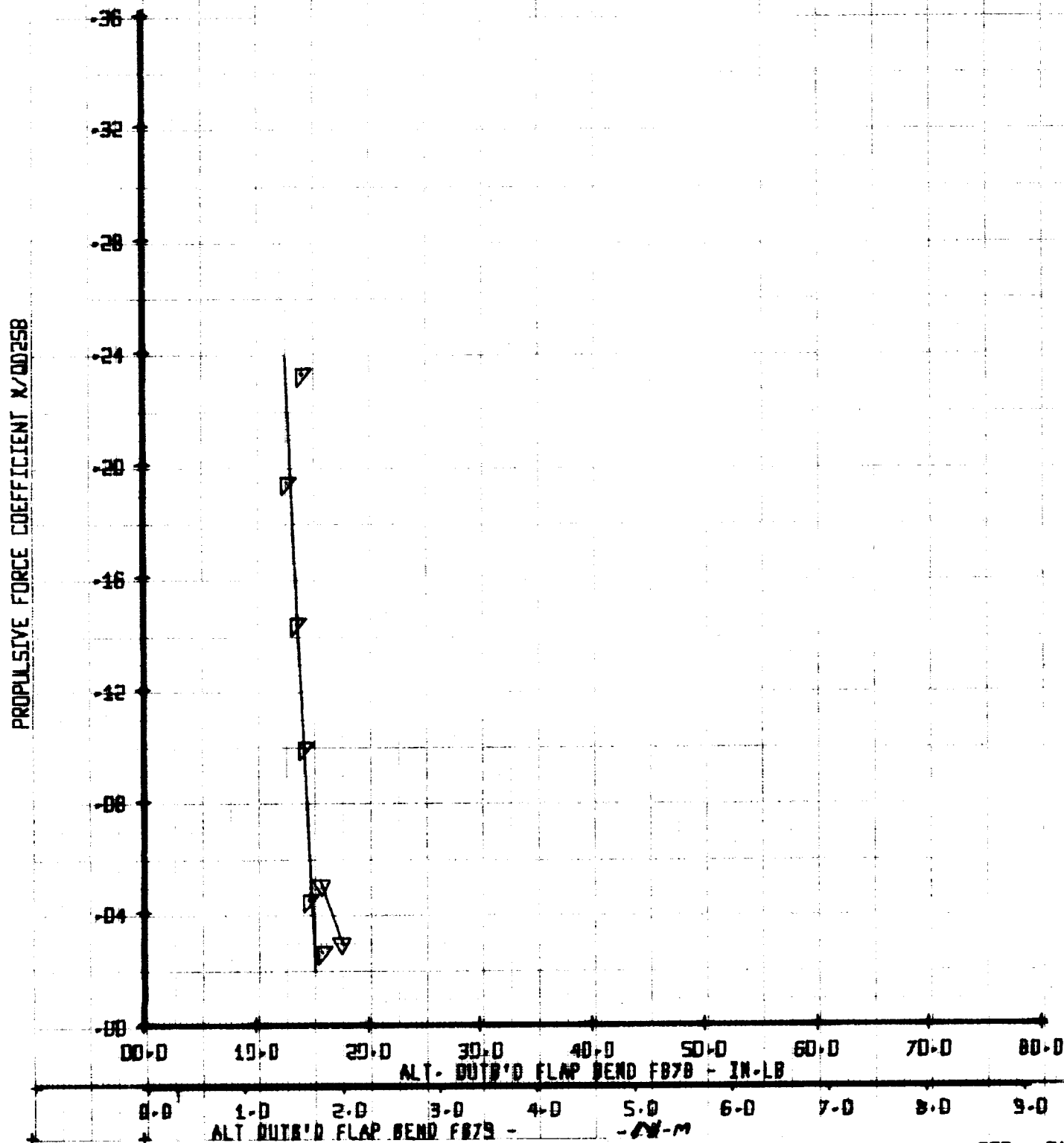


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT/58	VTUN
□	268 X	.53	.05	328
△	240	.58	.06	328
◇	266	.58	.08	328
▽	241	.58	.09	328
+	242 X	.58	.09	328
+	267 X	.58	.19	328

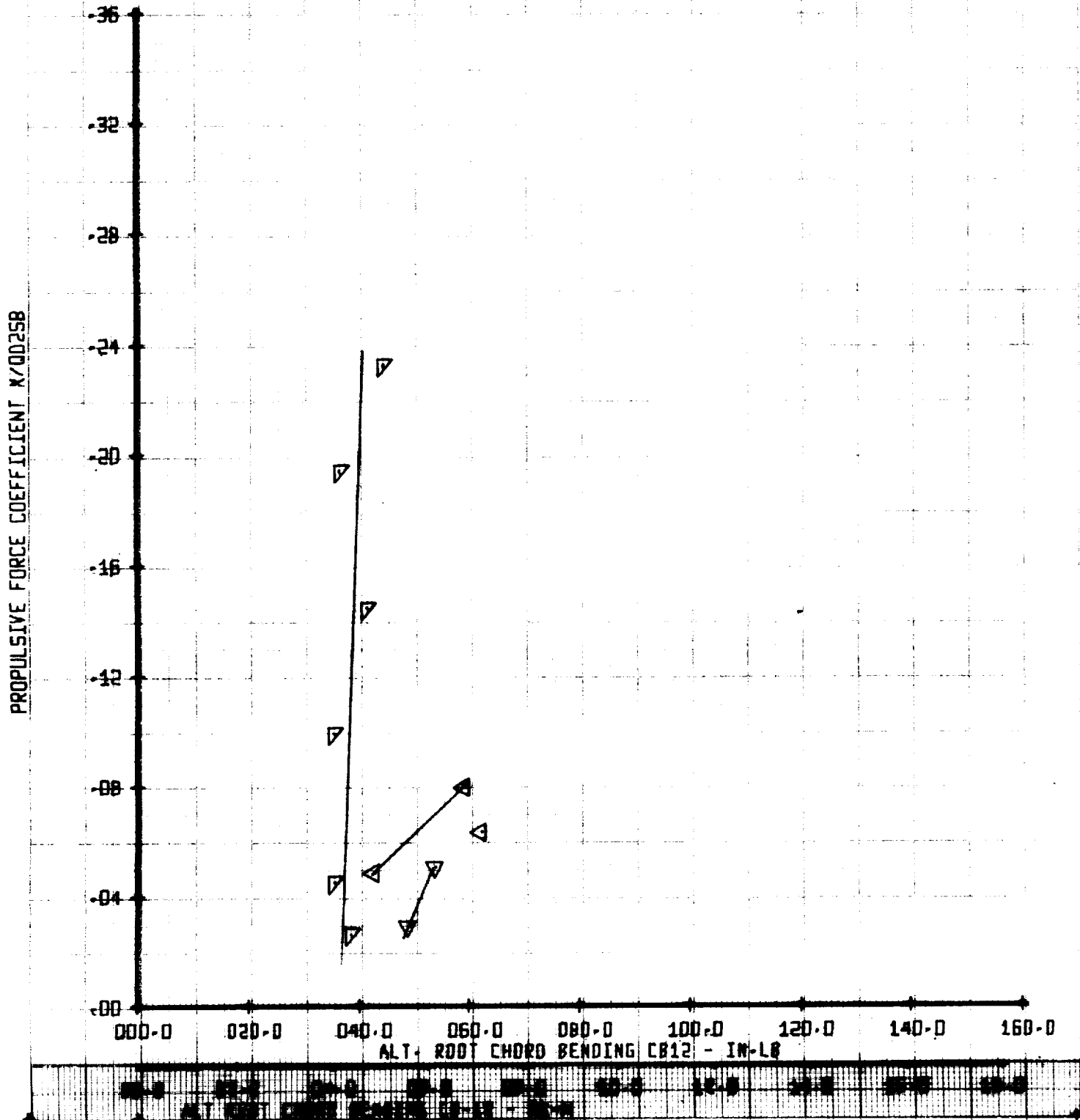
PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING OUTBOARD FLAP BENDING FB78



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND				
SYM	RUN	MU'	CT' / 50	VTUN
□	268	.53	.05	328
△	240	.53	.06	328
◇	266	.53	.08	328
▽	241	.53	.09	328
+	242	.53	.09	328
+	267	.53	.10	328

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

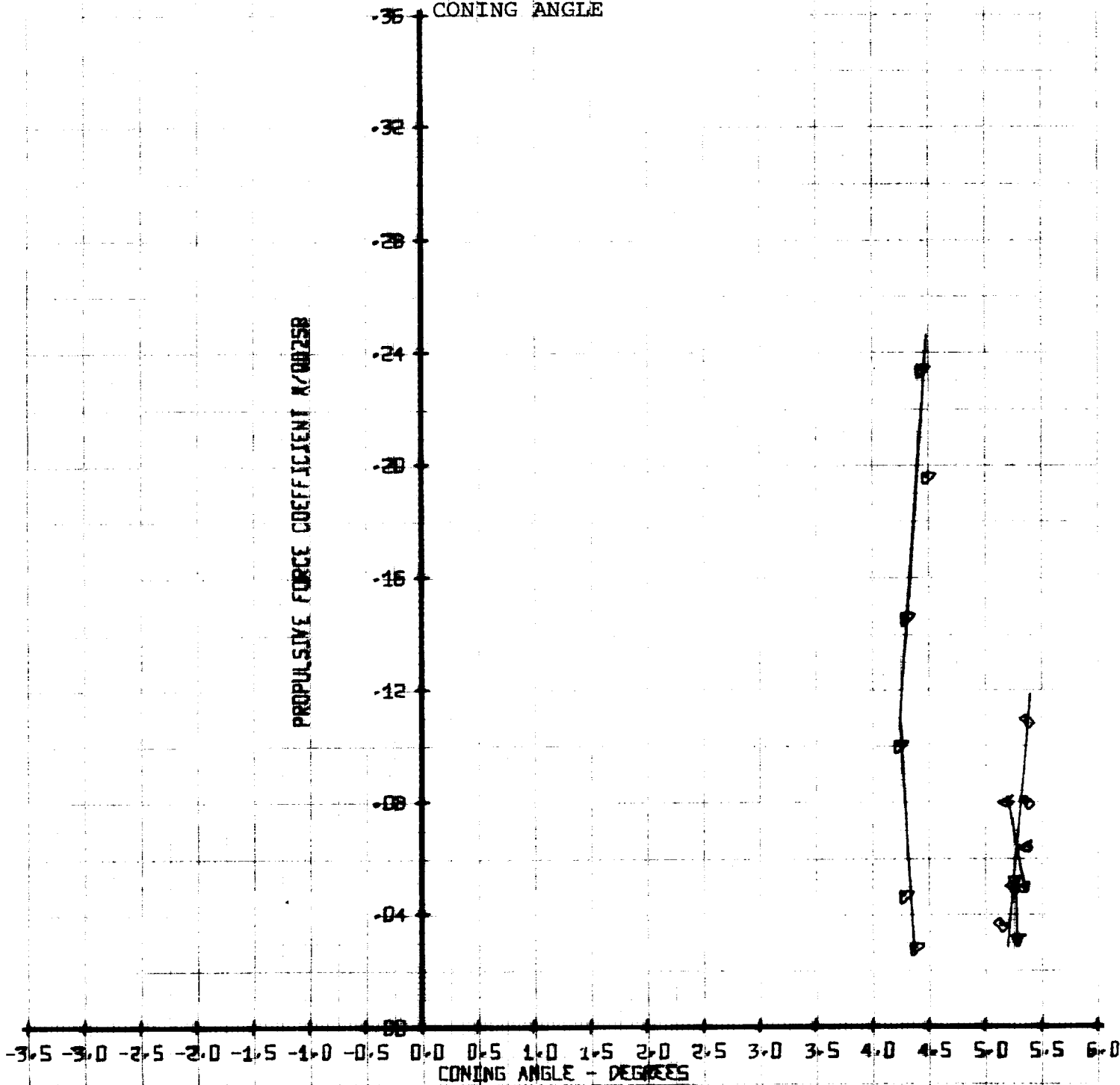


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT' / 258	Y/TUN
□	268	.53	.05	320
△	240	.53	.06	320
◇	266	.53	.08	320
▽	241	.53	.09	320
+	242	.53	.09	320
	267	.53	.10	320

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 CONING ANGLE



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47E ROTOR
PROPULSIVE FORCE LIMIT TESTING

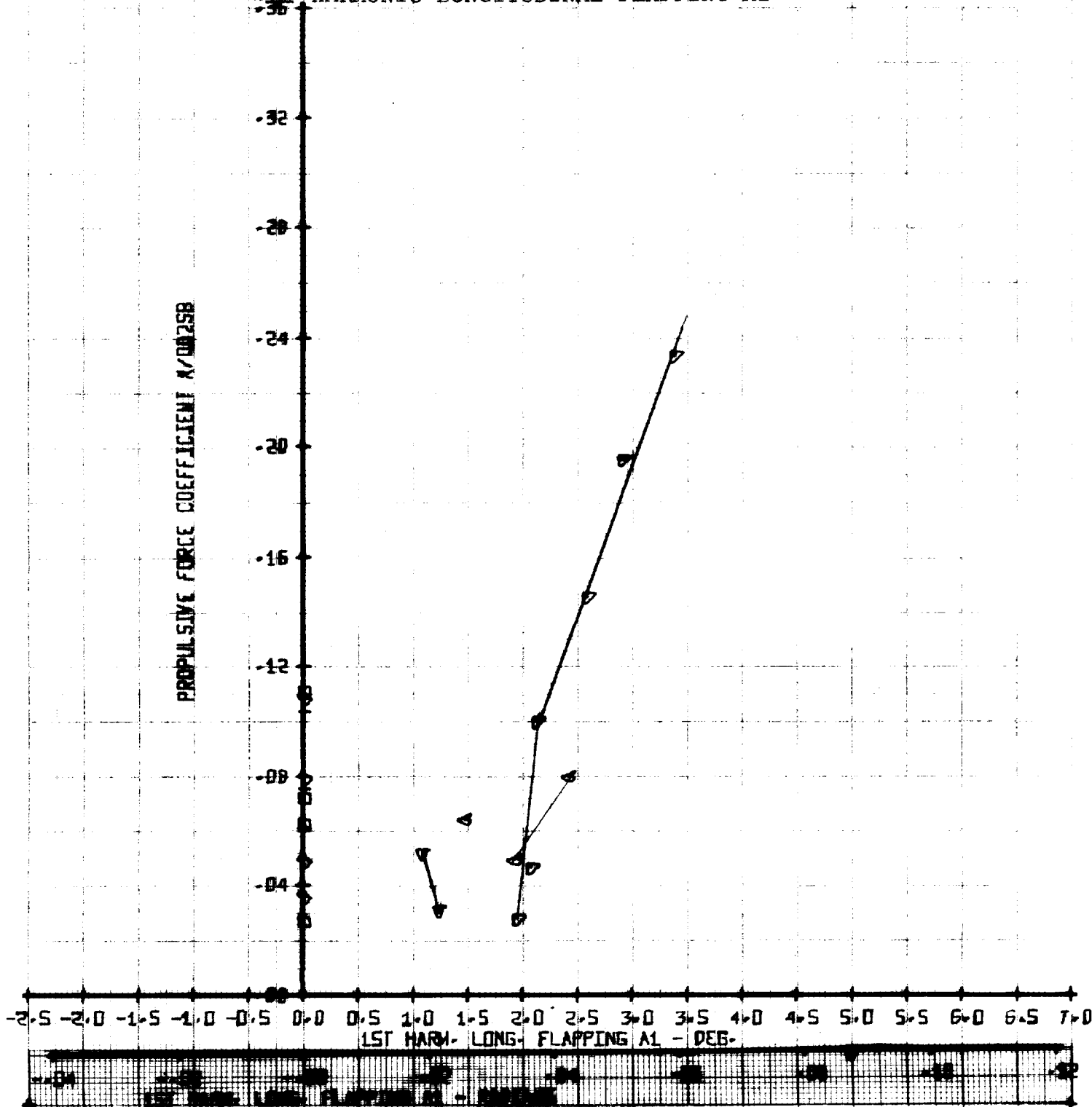
LEGEND

SYM	RUN	MU*	CT*/58	VTUN
□	268	.53	.05	320
△	240	.53	.06	320
▽	266	.53	.08	320
◇	241	.53	.09	320
+	242	.53	.09	320
+	267	.53	.10	320

PROPULSIVE FORCE COEFFICIENT

VERSUS

1ST HARMONIC LONGITUDINAL FLAPPING A1

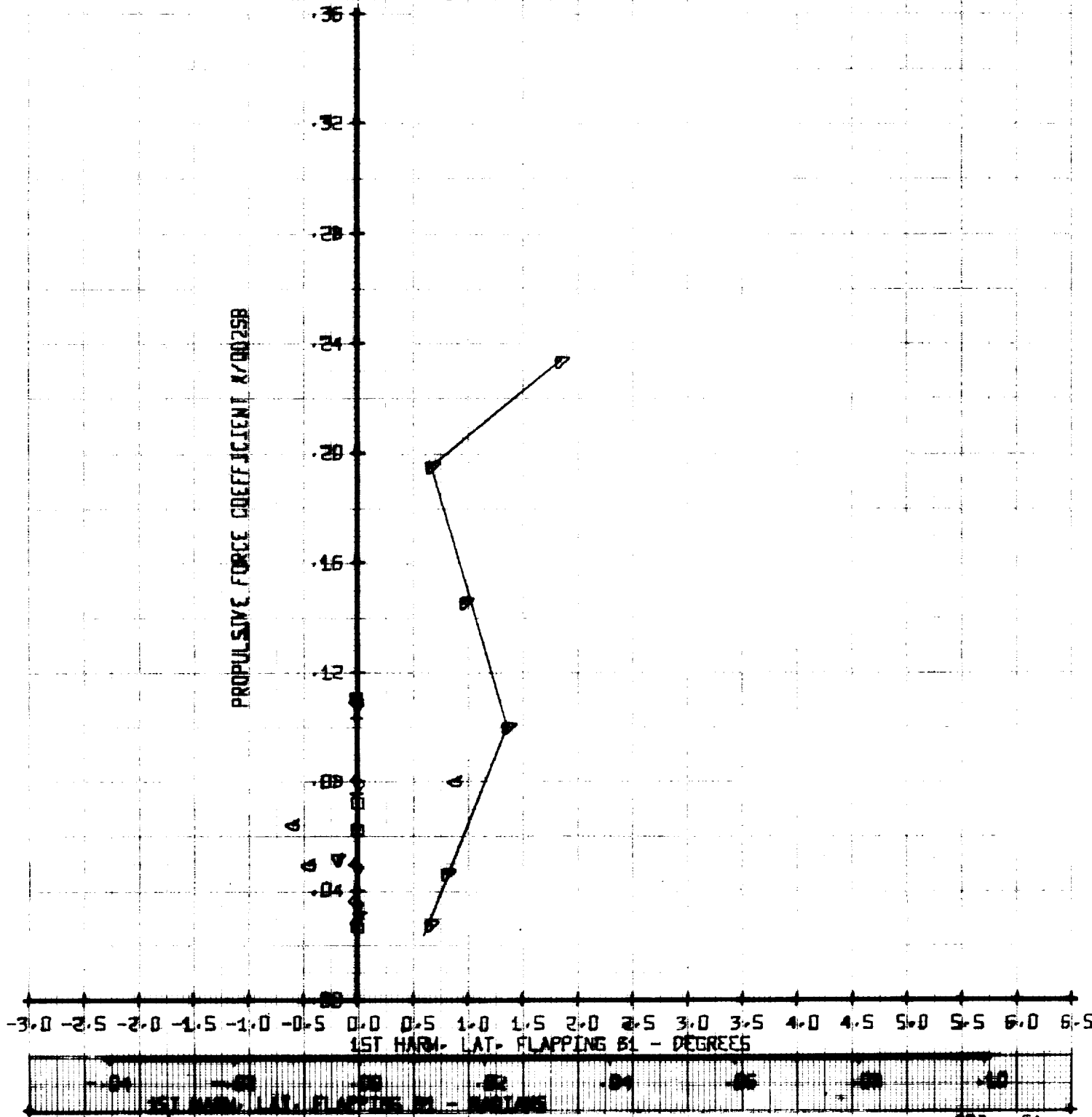


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	BLIN	MU'	CT'/58	YTUN
□	258	.53	.05	328
△	240	.53	.06	328
▽	266	.53	.08	328
◇	241	.53	.09	328
+	242	.53	.09	328
	267	.53	.10	328

PROPULSIVE FORCE COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

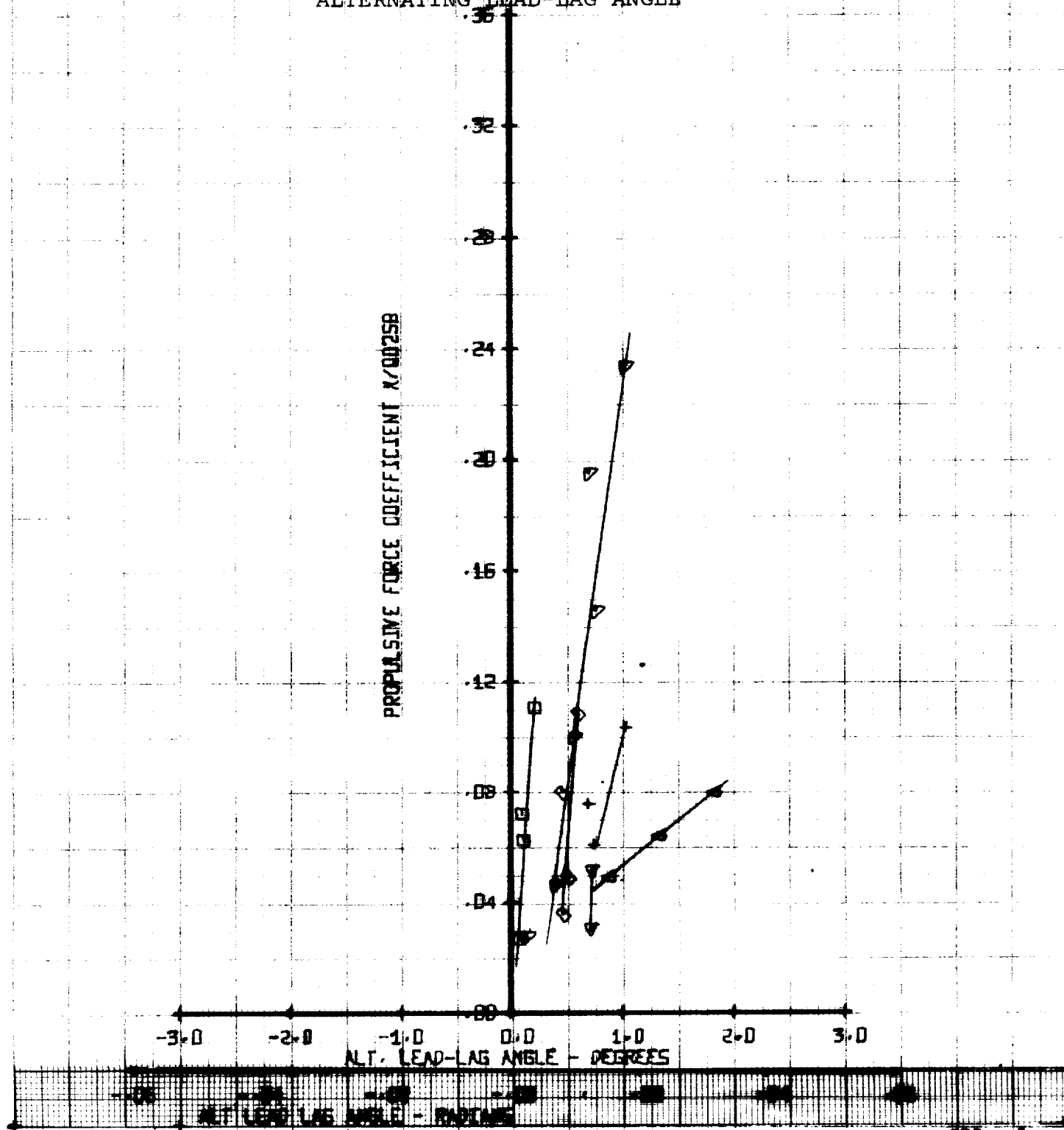


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/58	YTLN
□	268	.53	.05	328
△	240	.53	.06	328
◇	266	.53	.08	328
+	241	.53	.09	328
▽	242	.53	.09	328
+	267	.53	.10	328

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING LEAD-LAG ANGLE

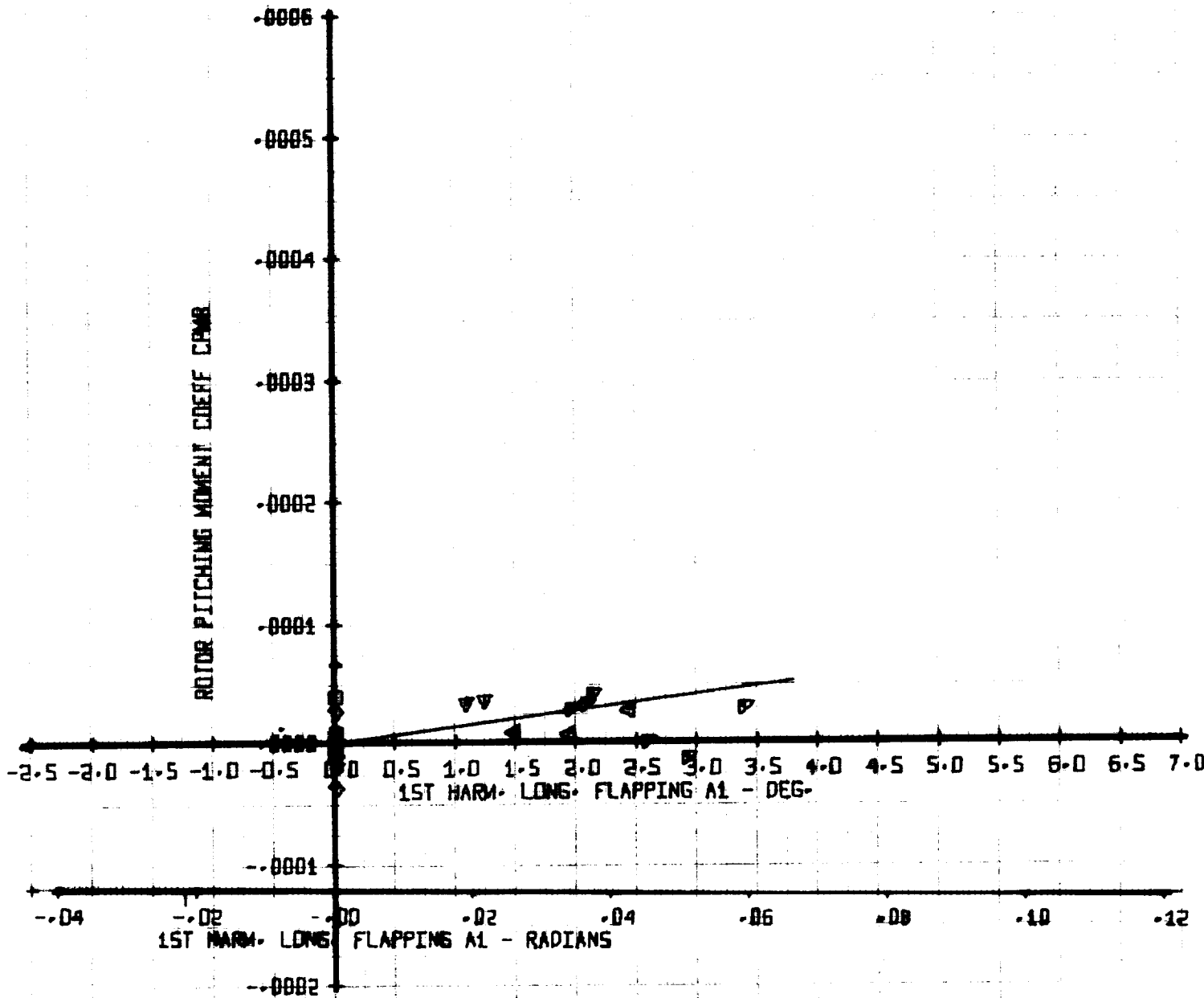


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/SB	YTLN
○	268	.53	.05	328
△	240	.53	.06	328
◇	266	.53	.08	328
▽	241	.53	.09	328
+	242	.53	.09	328
	267	.53	.10	328

ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1

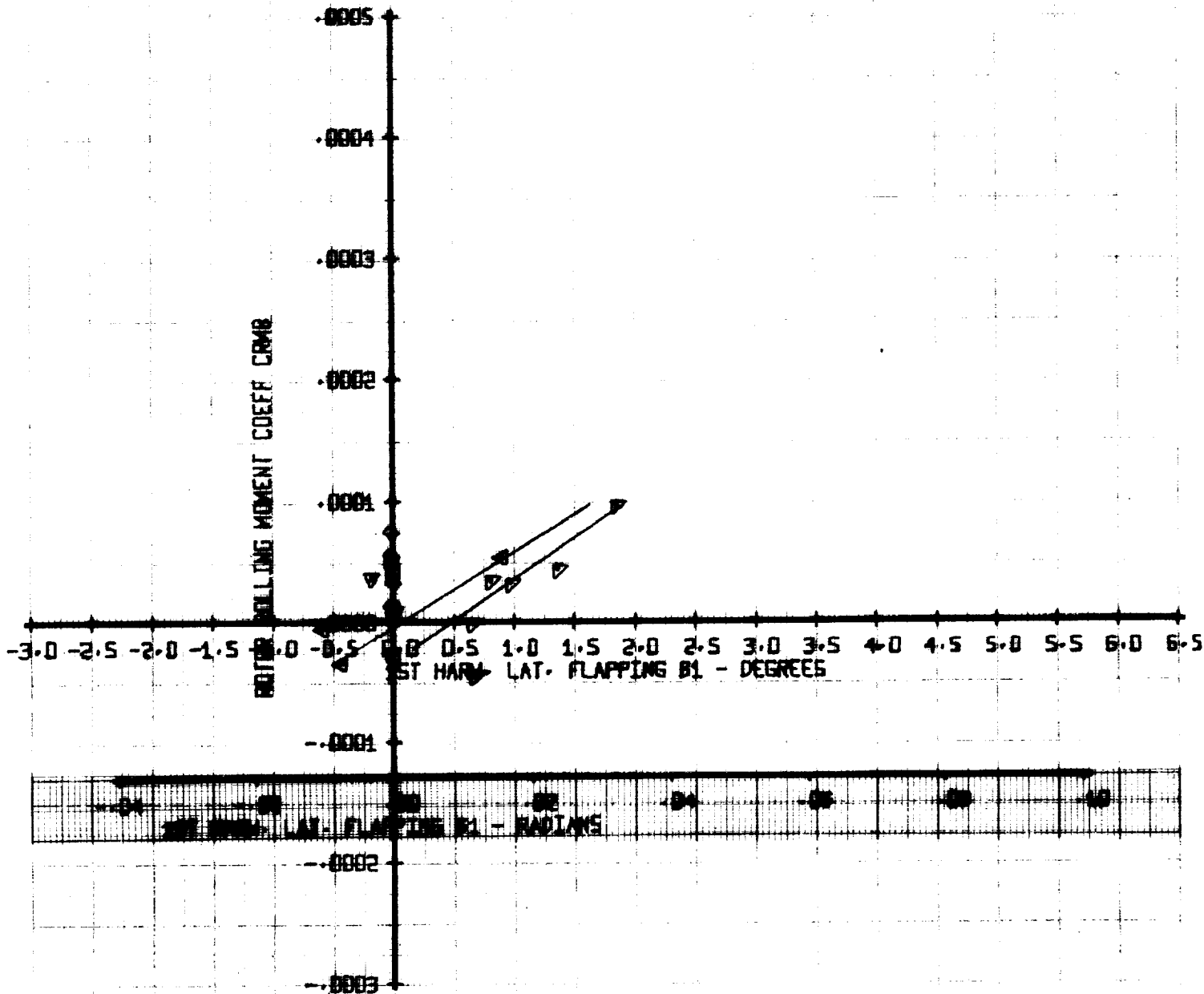


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	BLIN	MLI'	CT'/S8	YTLIN
□	268	.53	.05	328
△	240	.53	.06	328
◇	266	.53	.08	328
▽	241	.53	.09	328
+	242	.53	.09	328
	267	.53	.18	328

ROTOR ROLLING MOMENT COEFFICIENT
 VERSUS
 1ST HARMONIC LATERAL FLAPPING B1



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/SB	YTLN
□	264	.53	.05	328
▽	265	.53	.07	328

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PROPULSIVE FORCE COEFFICIENT

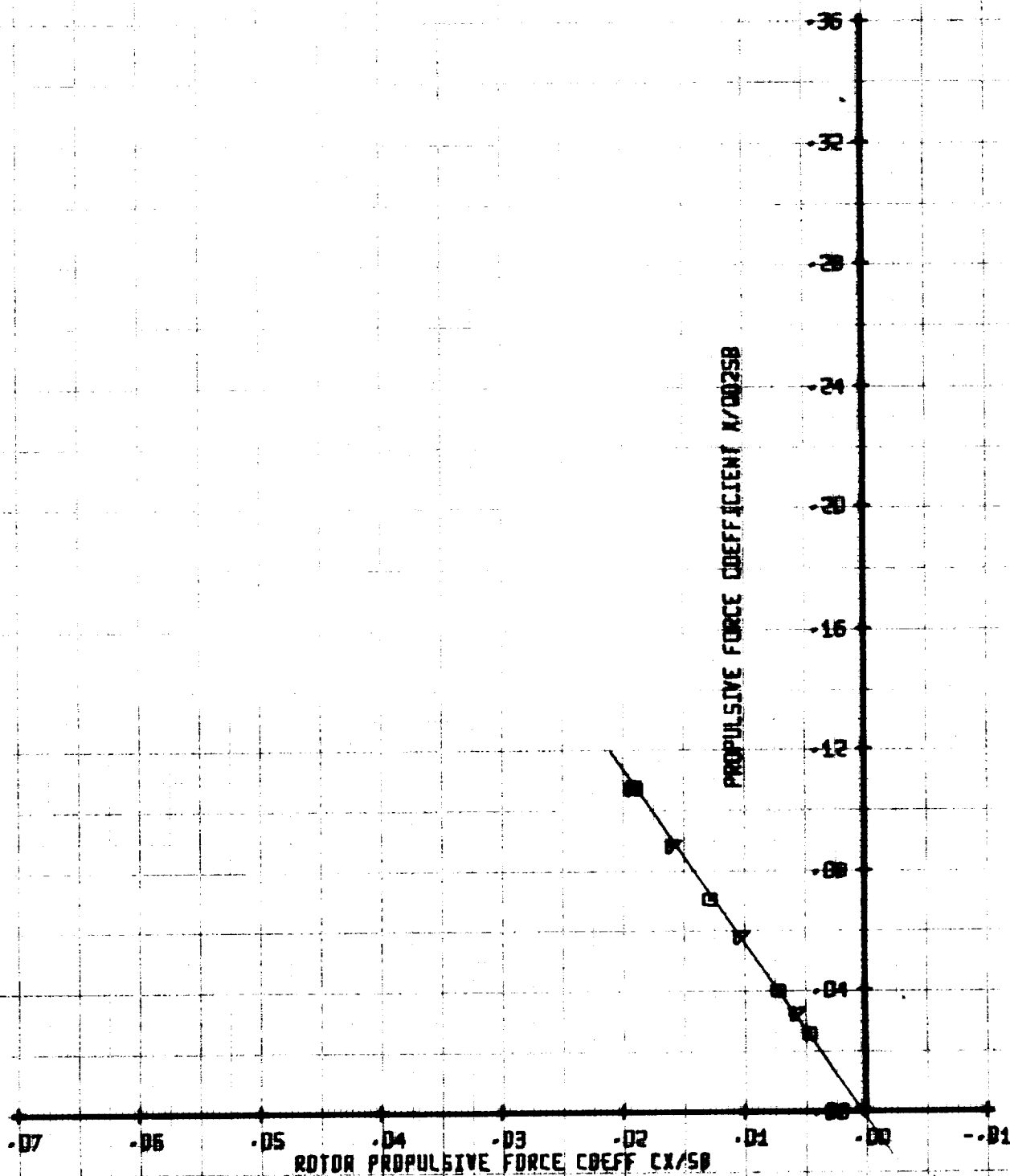
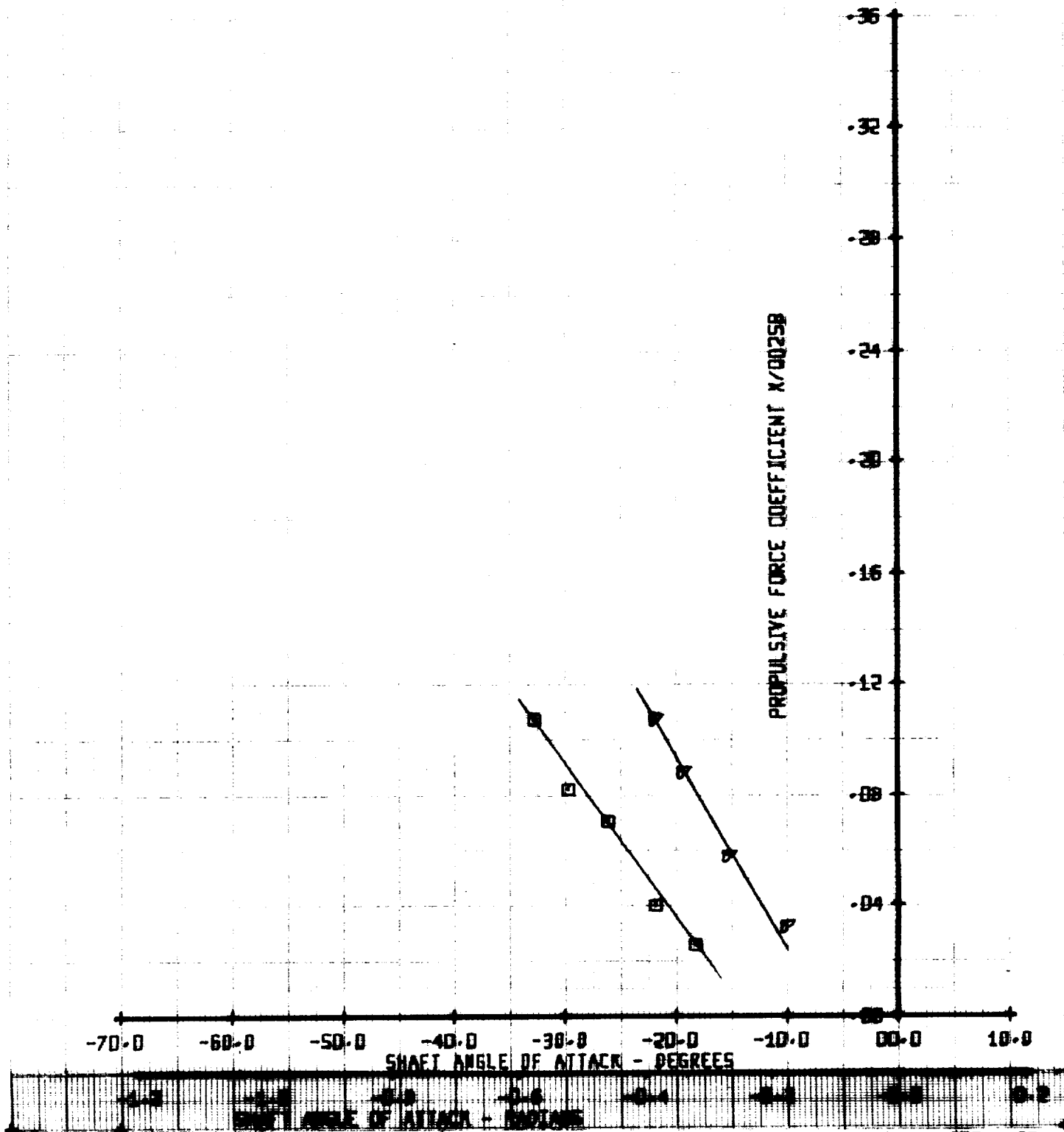


Figure B-150

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

		LEGEND		
SYM	RUN	ML'	CT'/SB	YTLN
□	264	.53	.05	328
▽	265	.53	.07	328

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 SHAFT ANGLE OF ATTACK

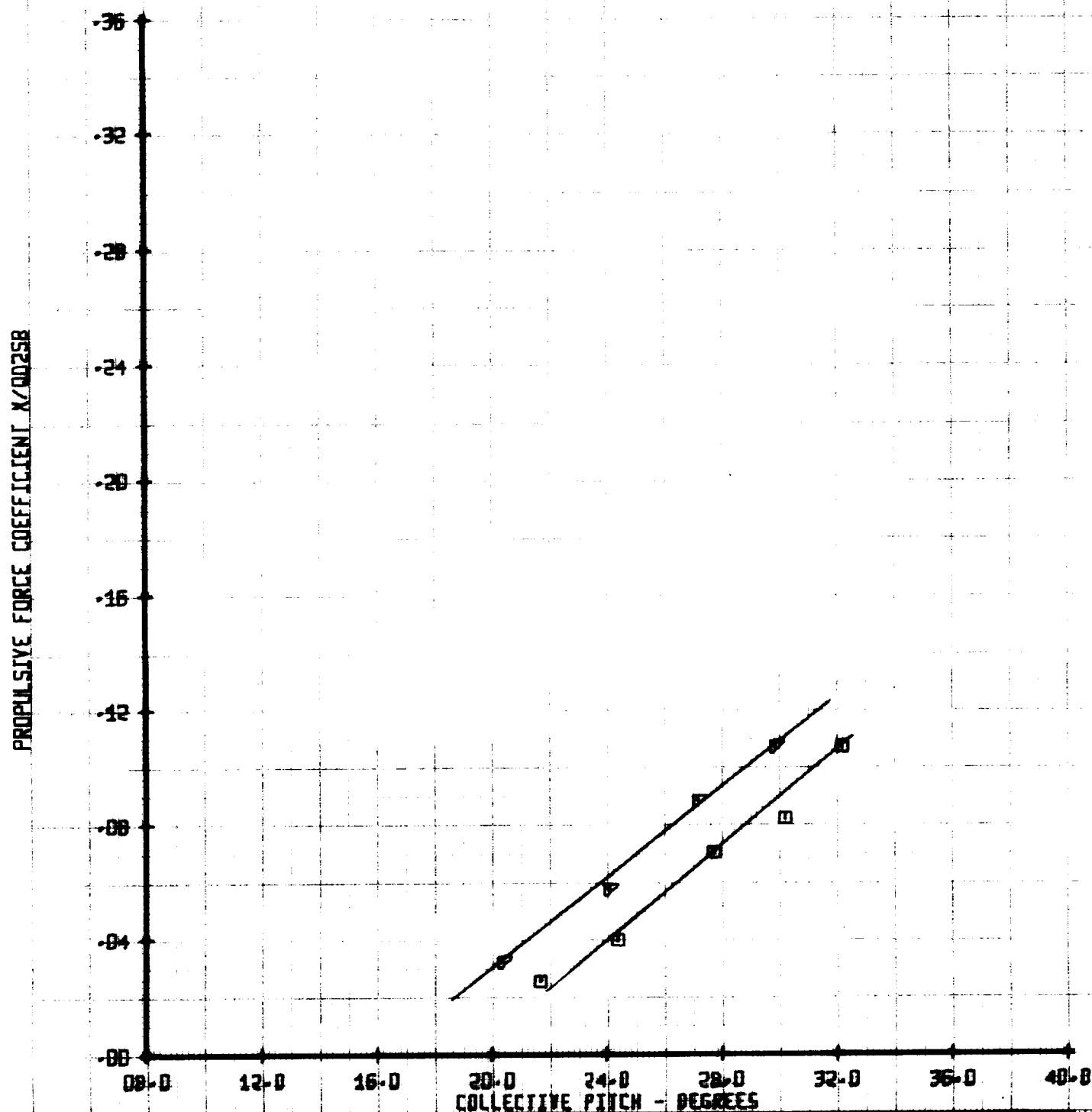


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/58	VTUM
□	264	.53	.05	320
△	265	.53	.07	320

PROPULSIVE FORCE COEFFICIENT
VERSUS
COLLECTIVE PITCH

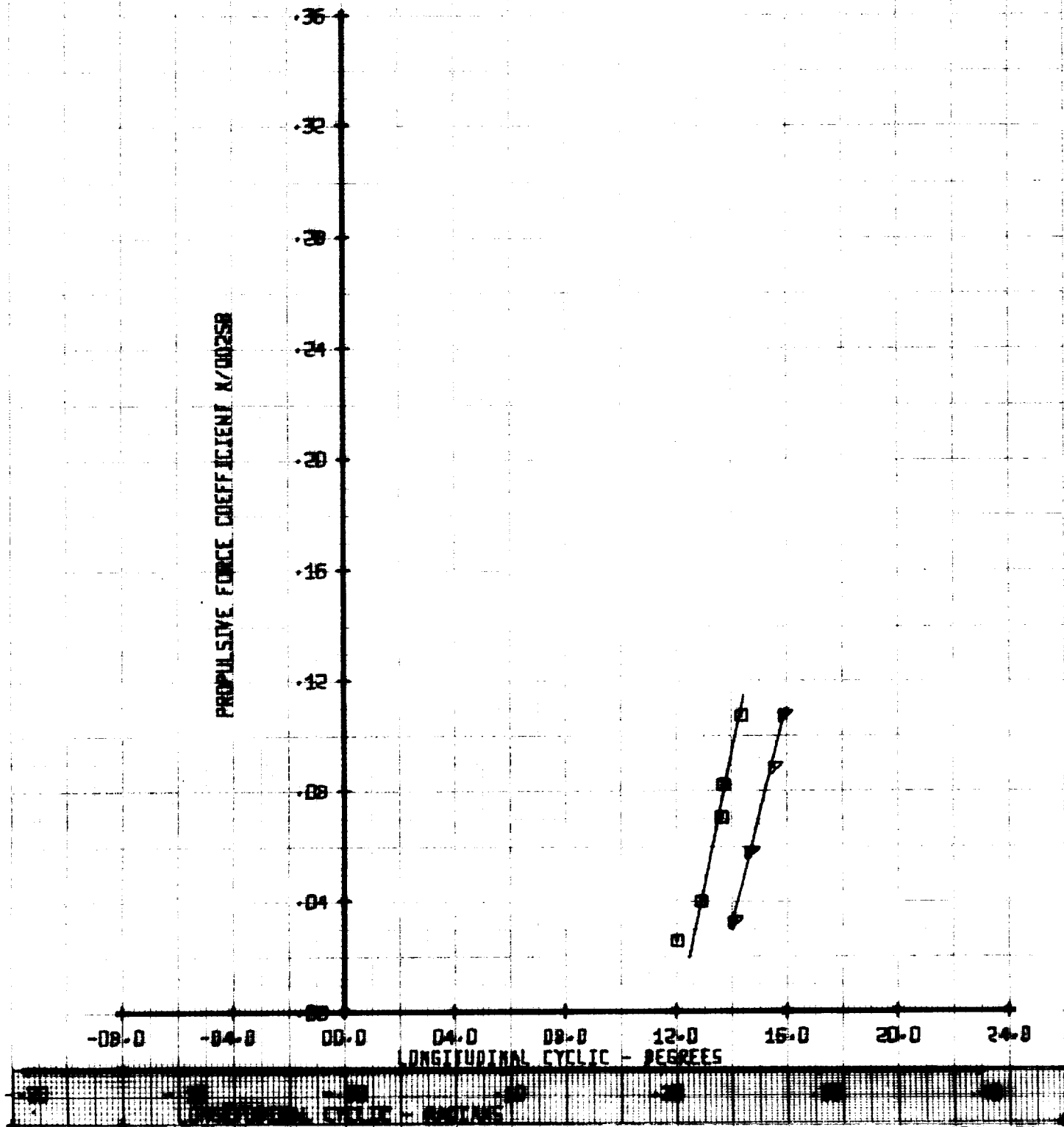


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	MIN	ML'	CT'/58	YTLN
□	254	.53	.05	320
▽	265	.53	.07	320

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LONGITUDINAL CYCLIC

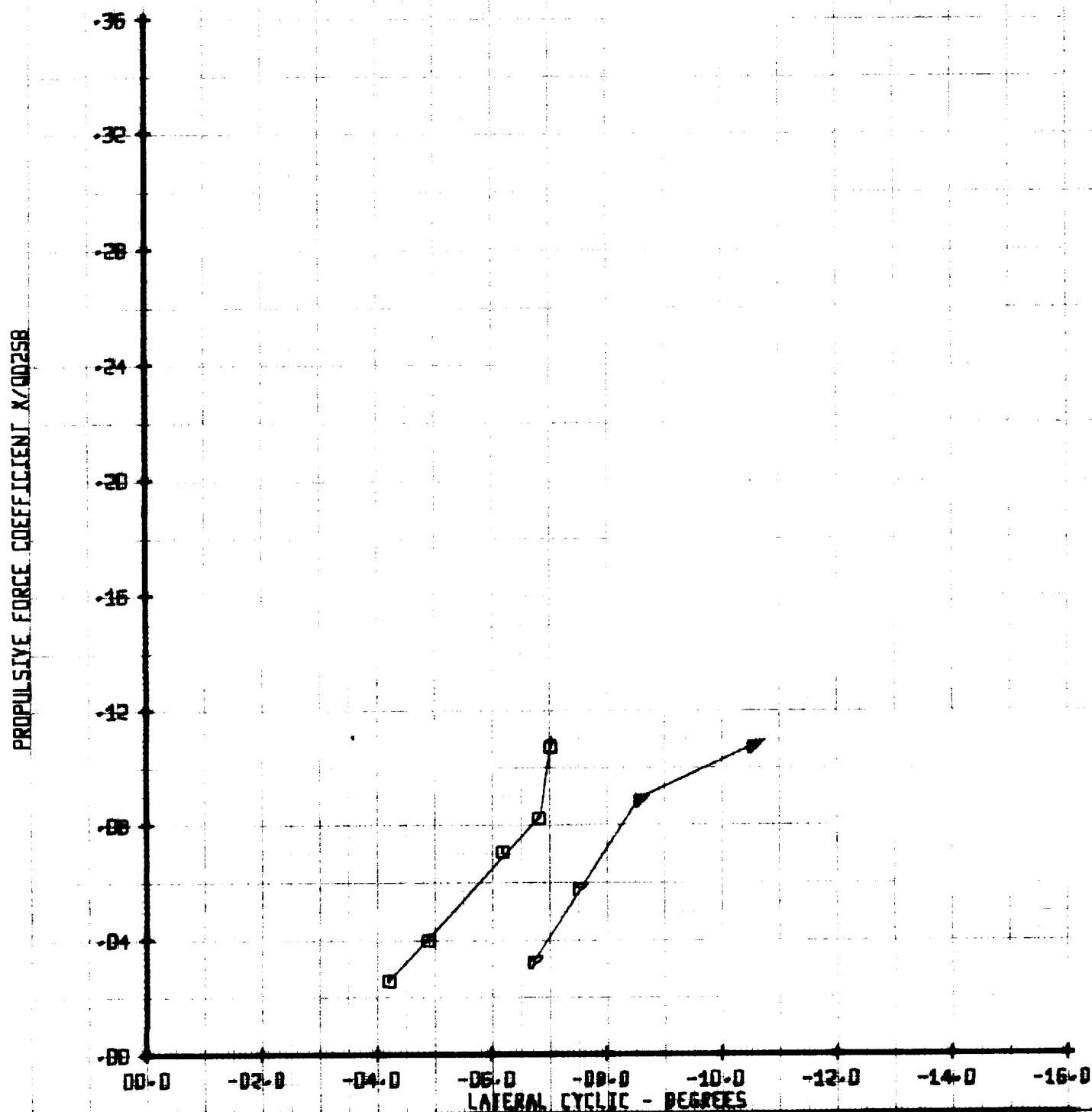


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT'YB	YTUN
□	264	.53	.05	320
△	265	.53	.07	320

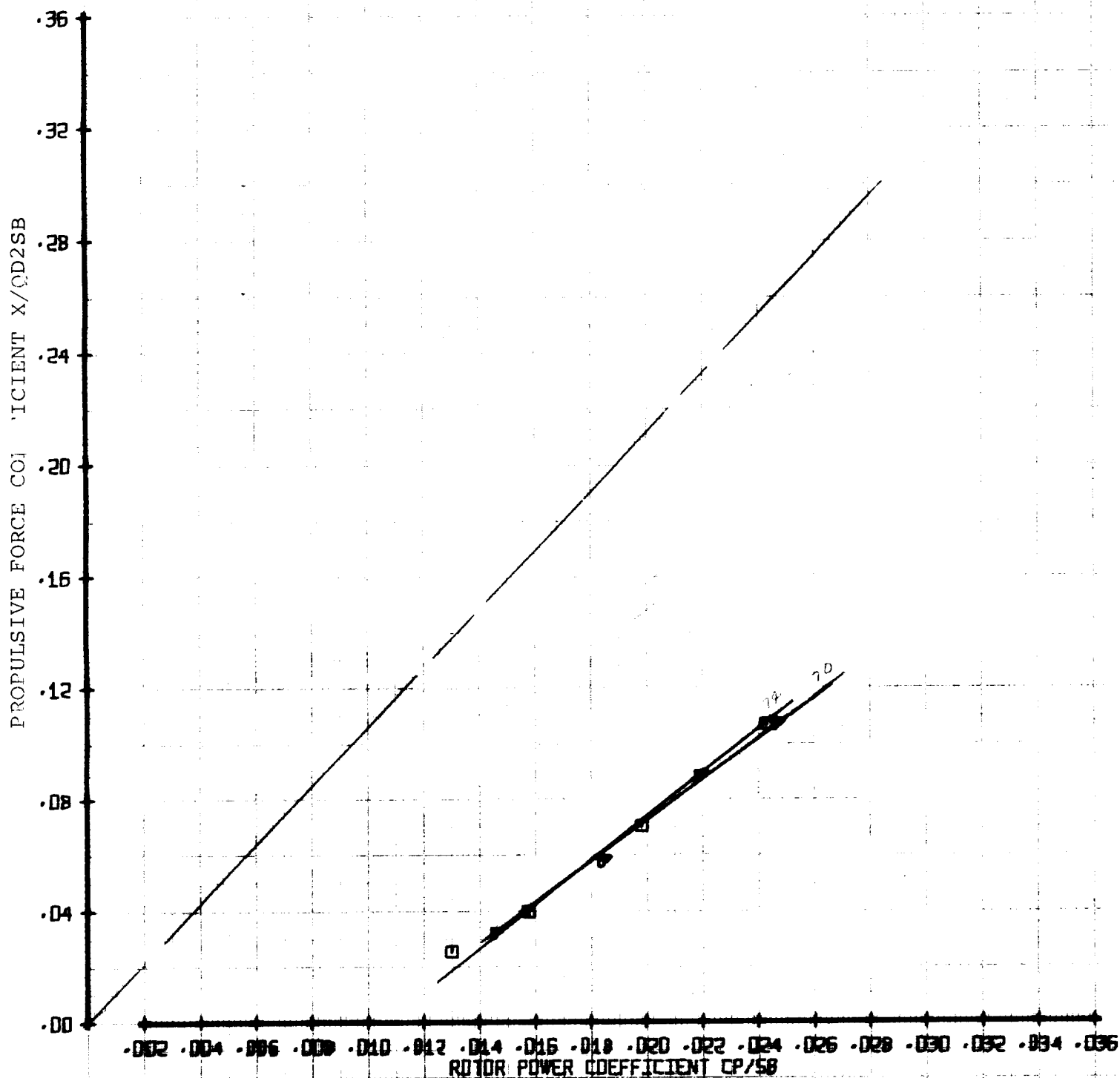
PROPULSIVE FORCE COEFFICIENT
VERSUS
LATERAL CYCLIC



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND				
SYM	RUN	MI'	CT'/58	YTLN
□	264	.53	.05	328
●	265	.53	.07	328

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT

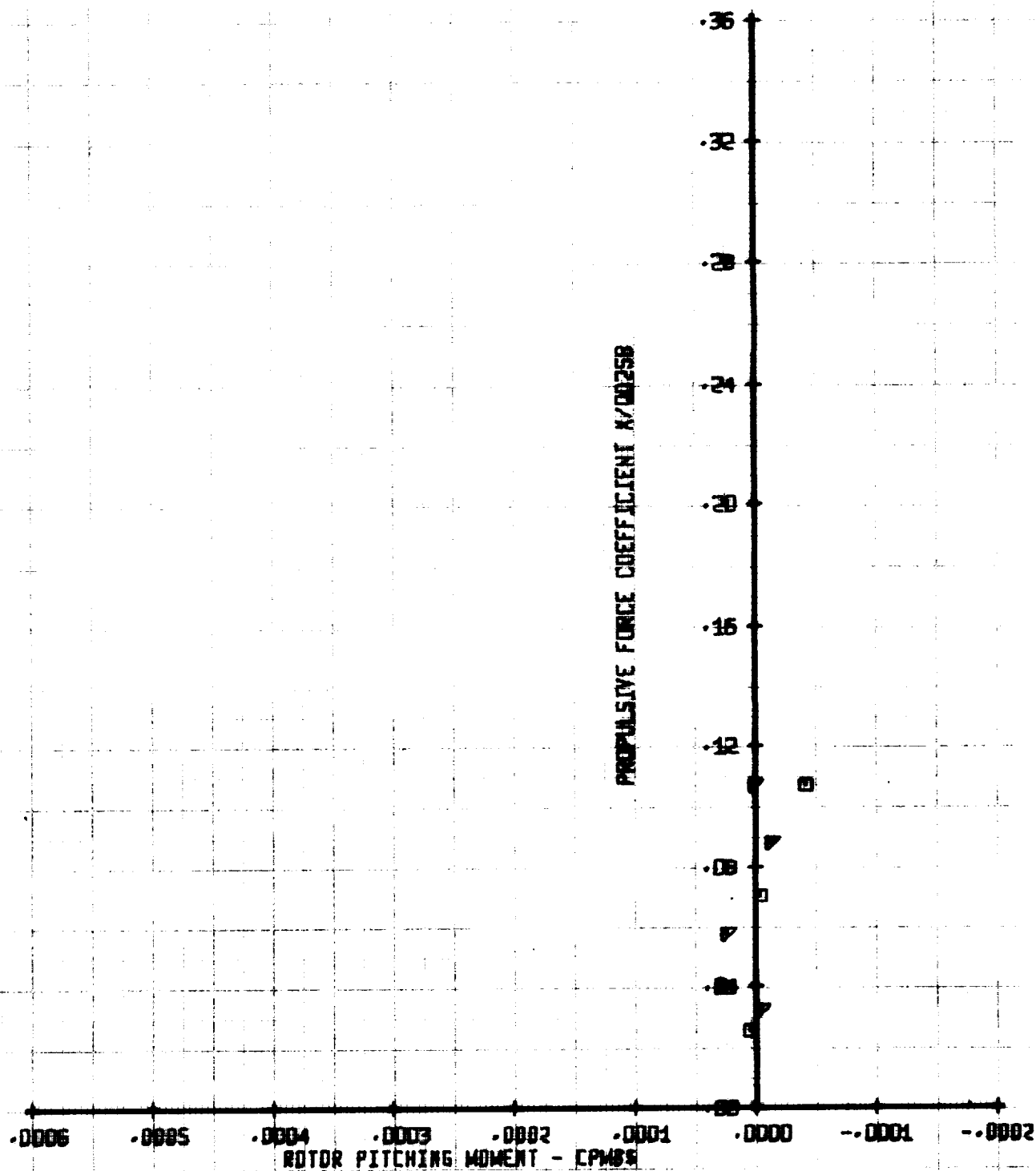


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	MIN	ML'	CT' / 58	YTLN
□	264	.53	.05	328
▽	265	.53	.07	328

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PITCHING MOMENT

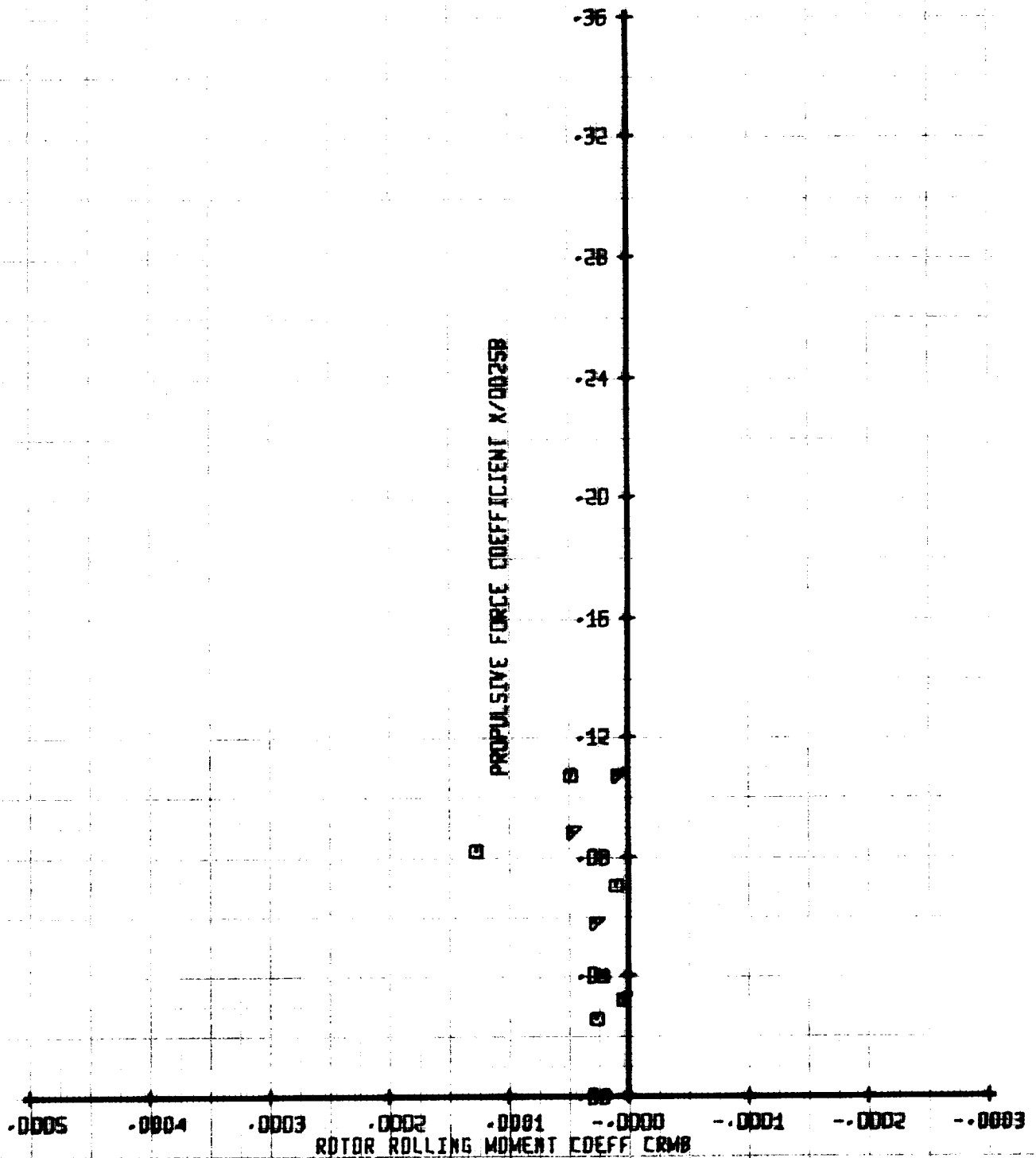


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/SB	VTUN
□	264	.53	.05	328
△	265	.53	.07	328

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR ROLLING MOMENT COEFFICIENT

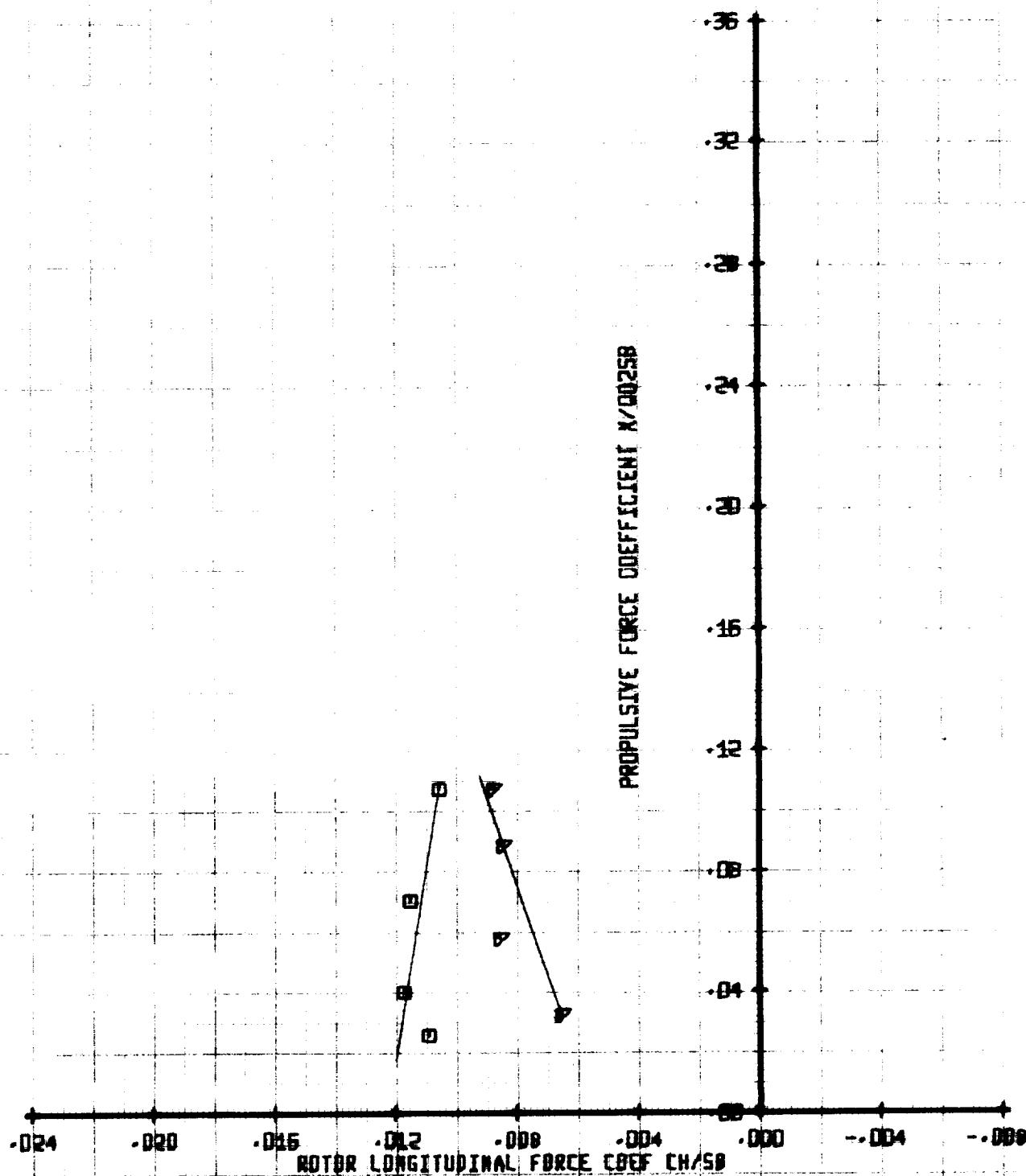


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM
□
△RUN
264
265MU'
.53
.53CT'/SB
.05
.07VTUN
320
320

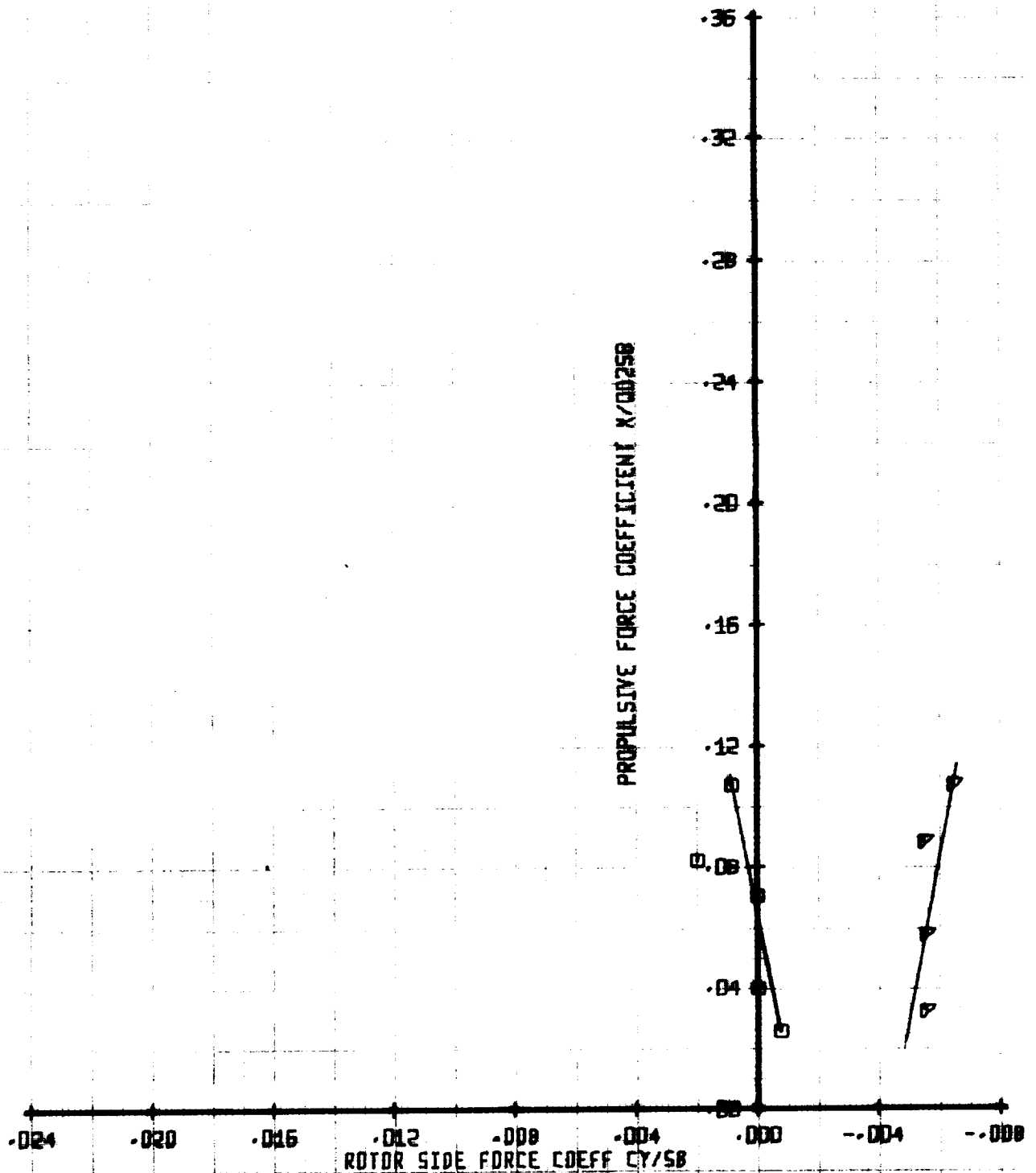
PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR LONGITUDINAL FORCE COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND				
SYM	RUN	ML'	CT'/SB	VTUN
□	264	.53	.05	320
▽	265	.53	.07	320

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR SIDE FORCE COEFFICIENT



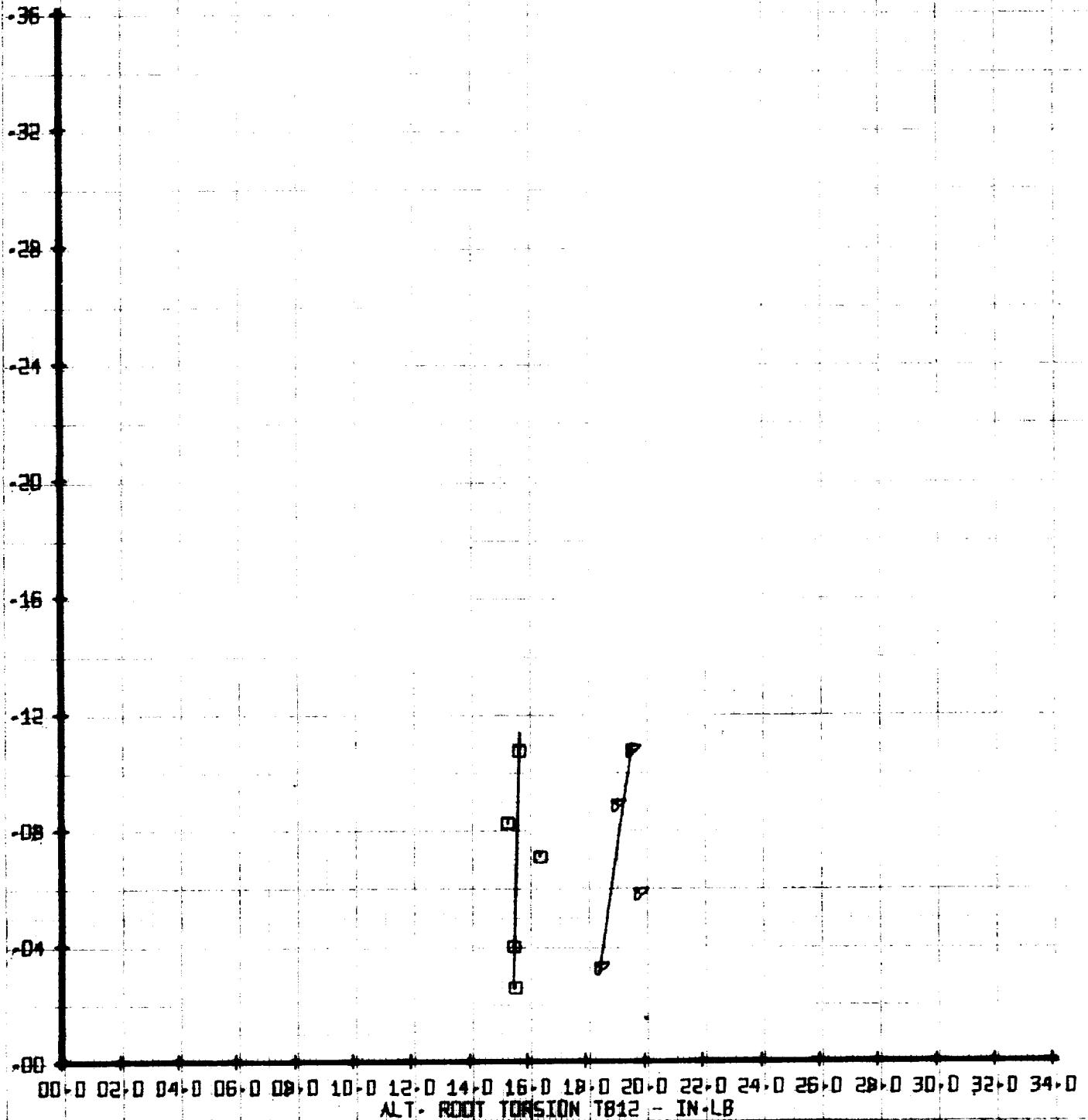
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VILIN
□	264	.53	.05	320
△	265	.53	.07	320

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

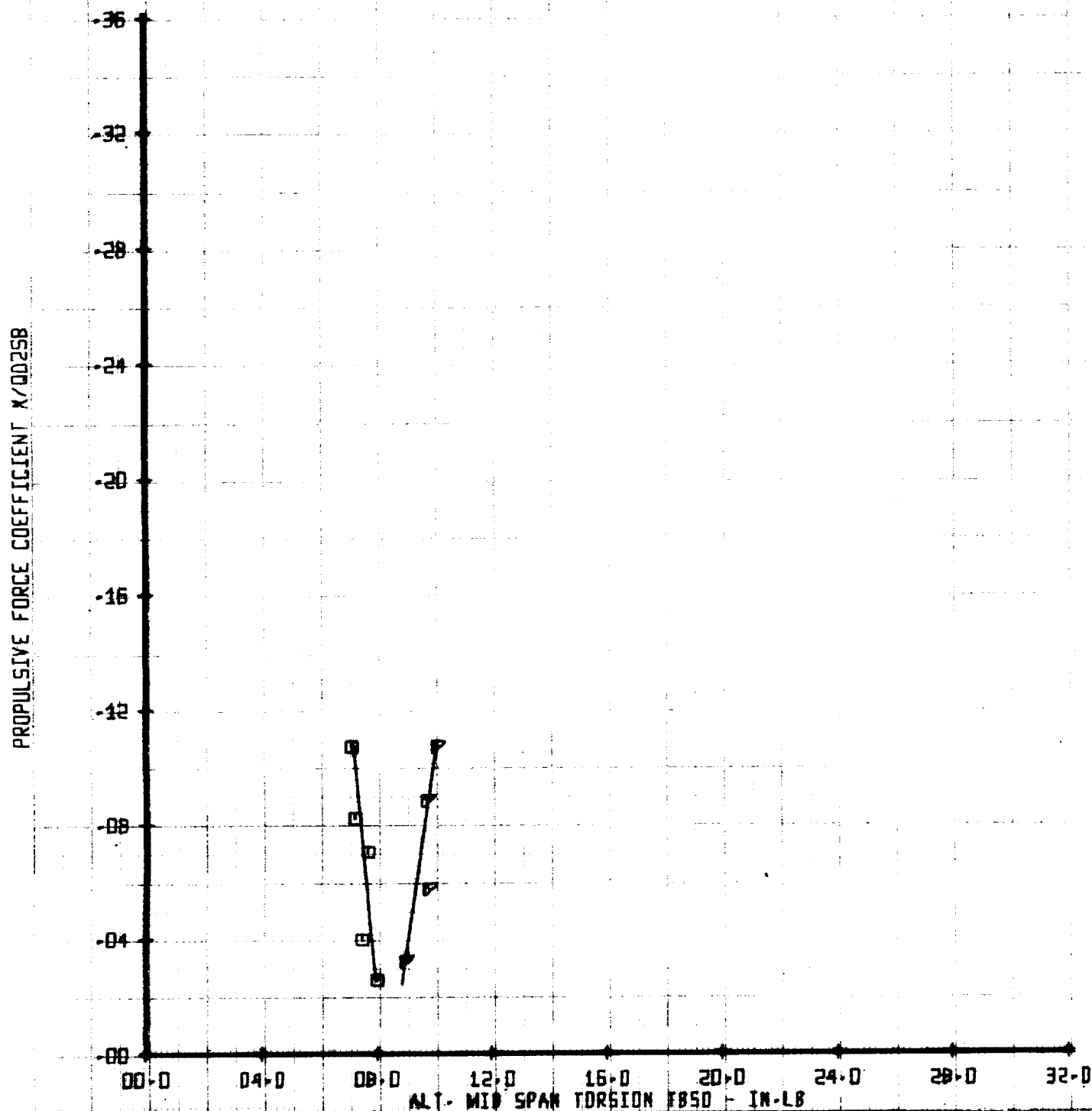
PROPULSIVE FORCE COEFFIC IT X/00258



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND		CT' / 50	VTOW
SYM	RUN	ML'	
□	264	.53	320
▽	265	.53	320

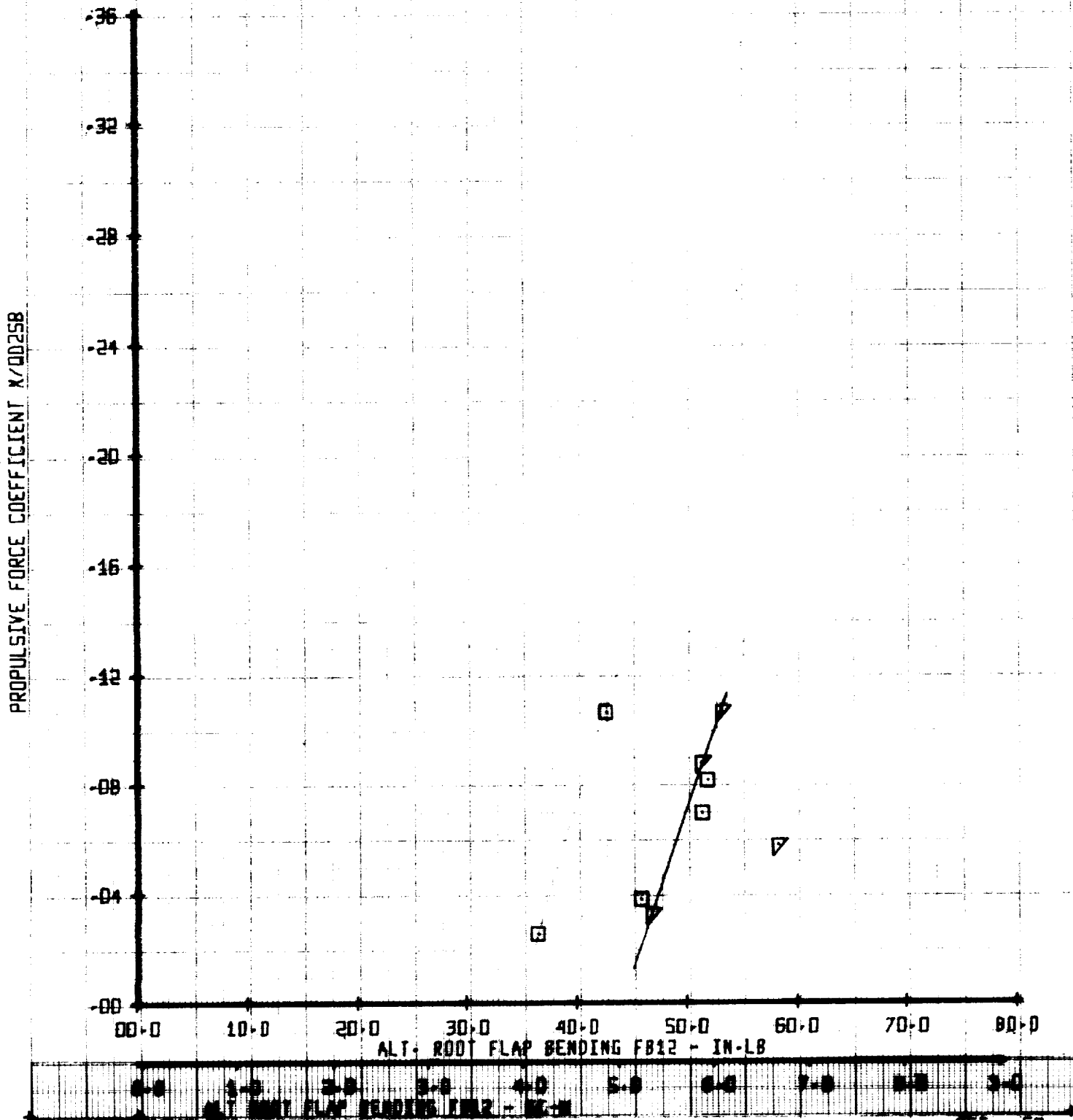
PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING MID SPAN TORSION TB50



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND		CT'/58	VTLM
SYM	RUN	MI'	
□	264	.53	328
▽	265	.53	328

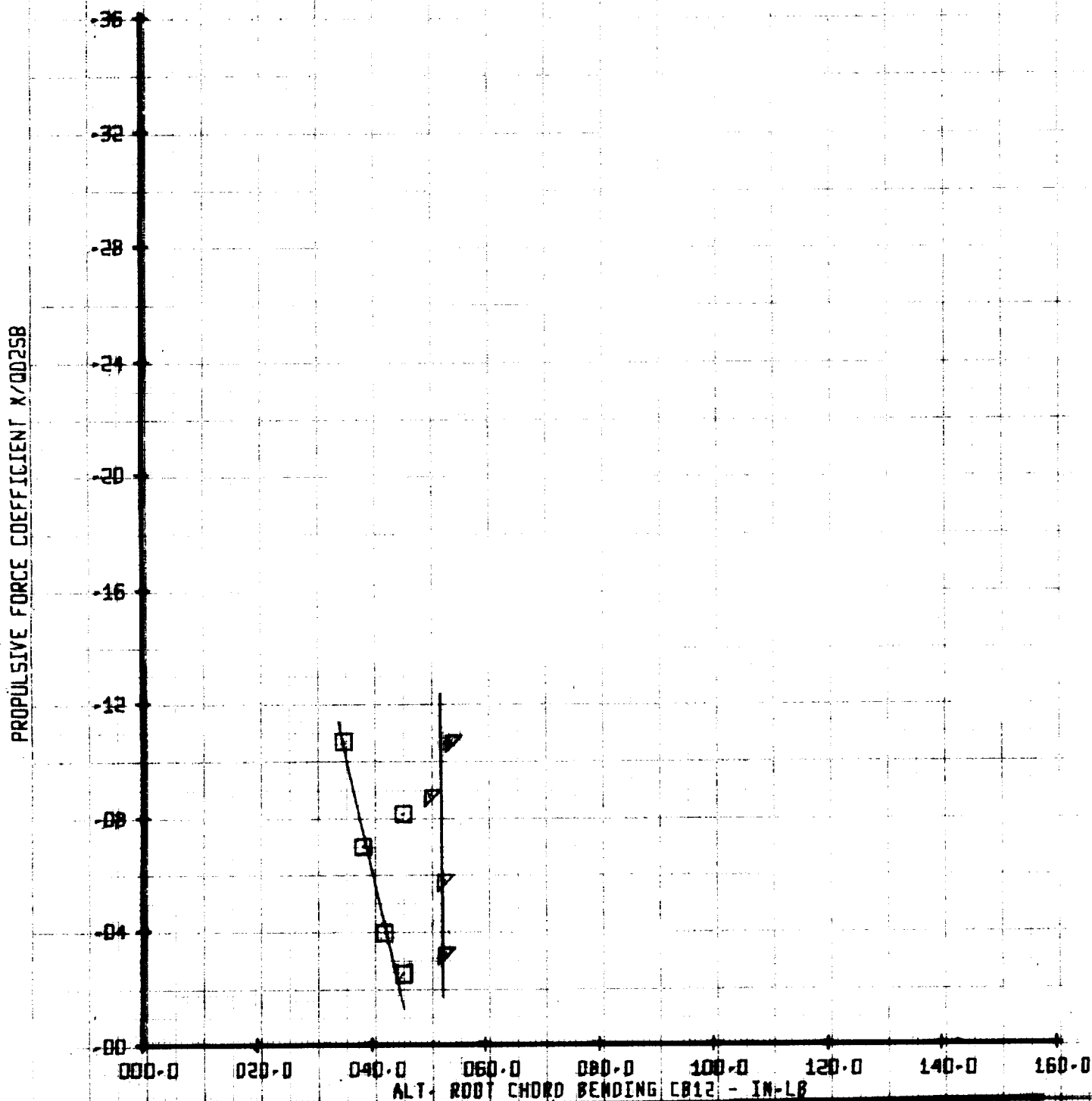
PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND		ML'	CT' %S	VTUN
SYM	RUN			
□	264	.53	.05	320
▴	265	.53	.07	320

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12

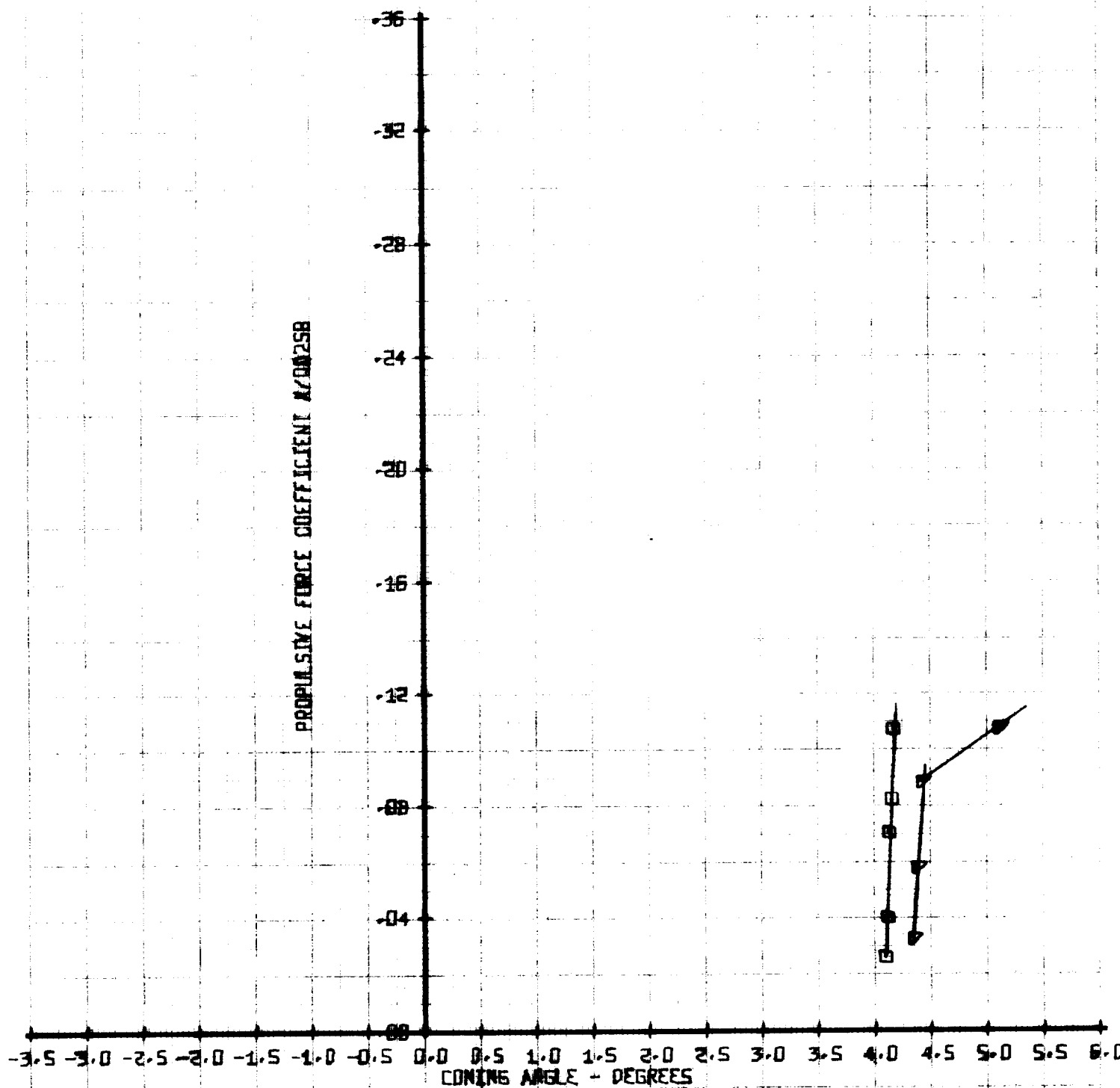


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / 258	YTLN
□	264	.53	.05	328
△	265	.53	.07	328

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 CONING ANGLE

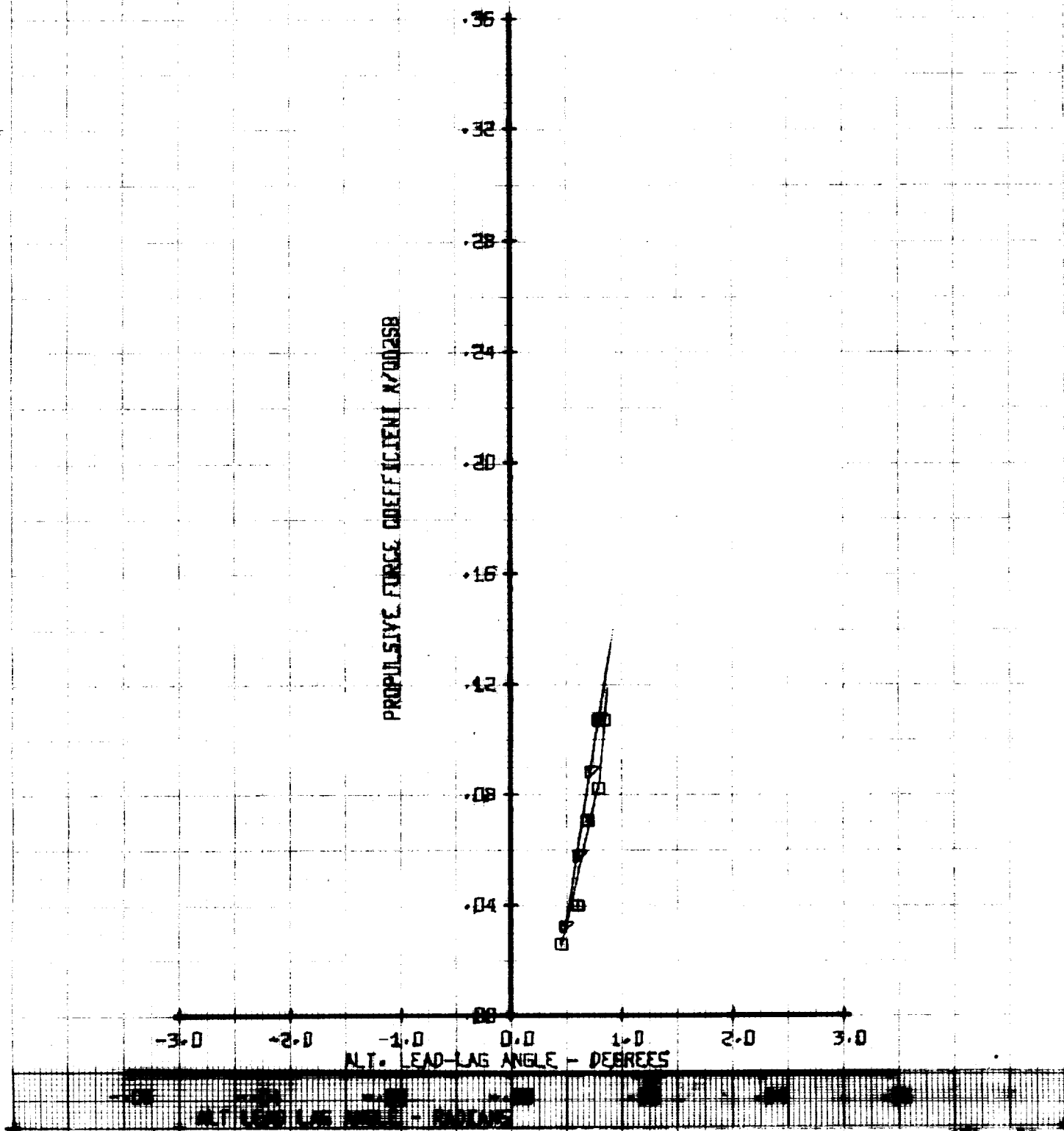


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE OH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	YOUN
□	264	.53	.05	328
△	265	.53	.07	328

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING LEAD-LAG ANGLE

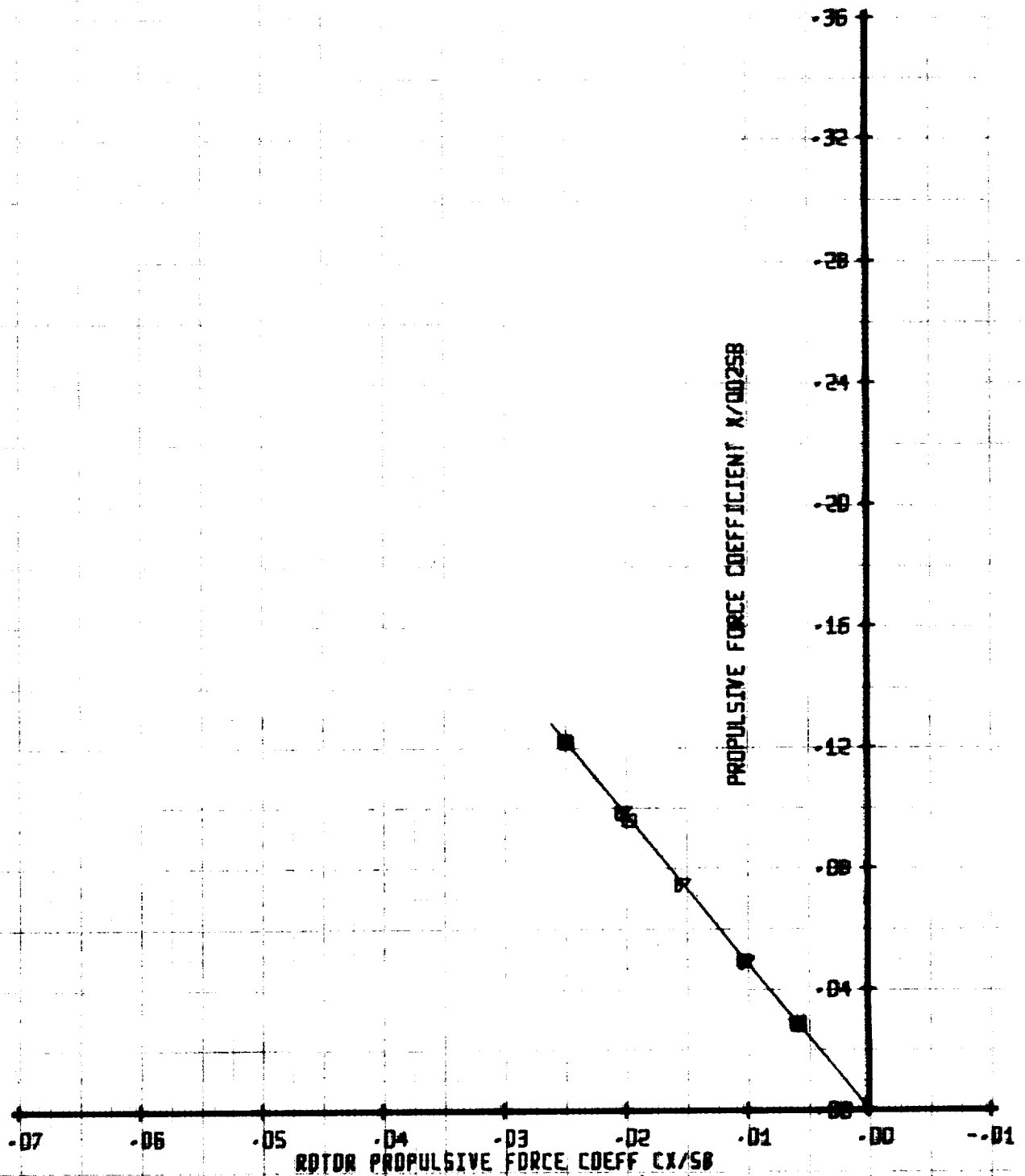


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VTUM
0	236	.57	06	358
7	237	.57	.076	358

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PROPULSIVE FORCE COEFFICIENT

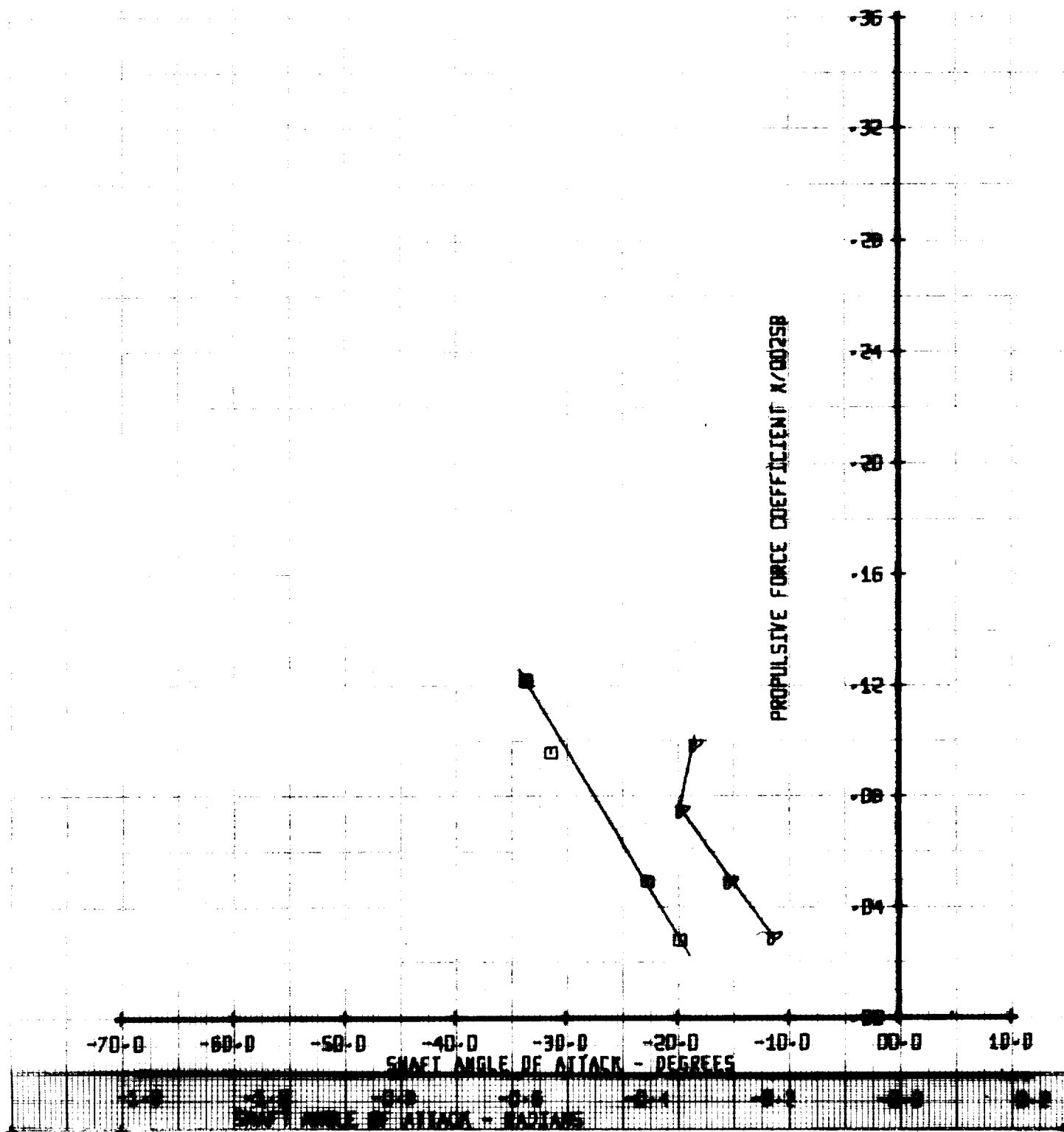


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VTUM
□	236	.57	.06	353
△	237	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 SHAFT ANGLE OF ATTACK

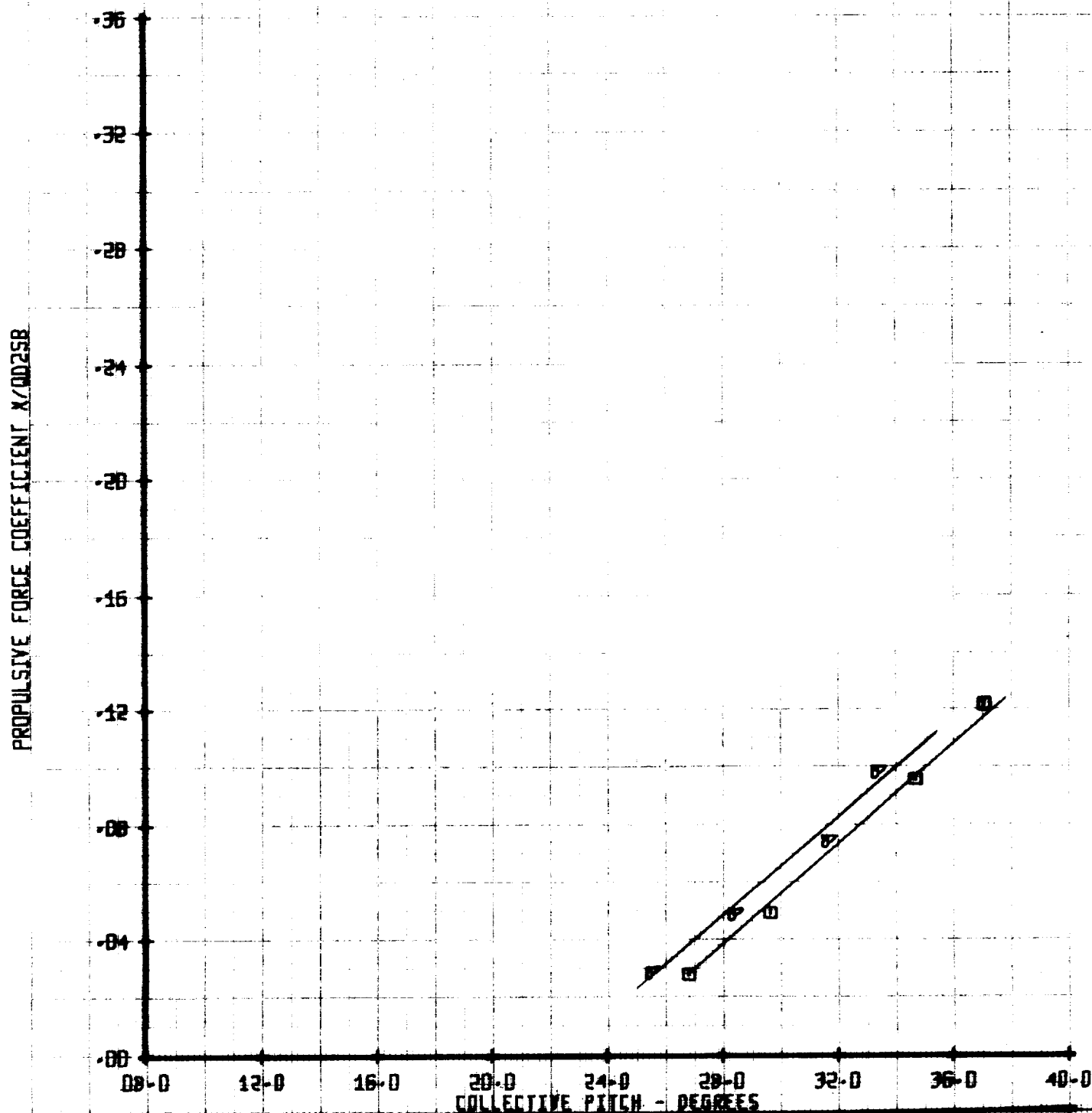


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VTUN
□	236	.57	06	353
△	237	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
VERSUS
COLLECTIVE PITCH

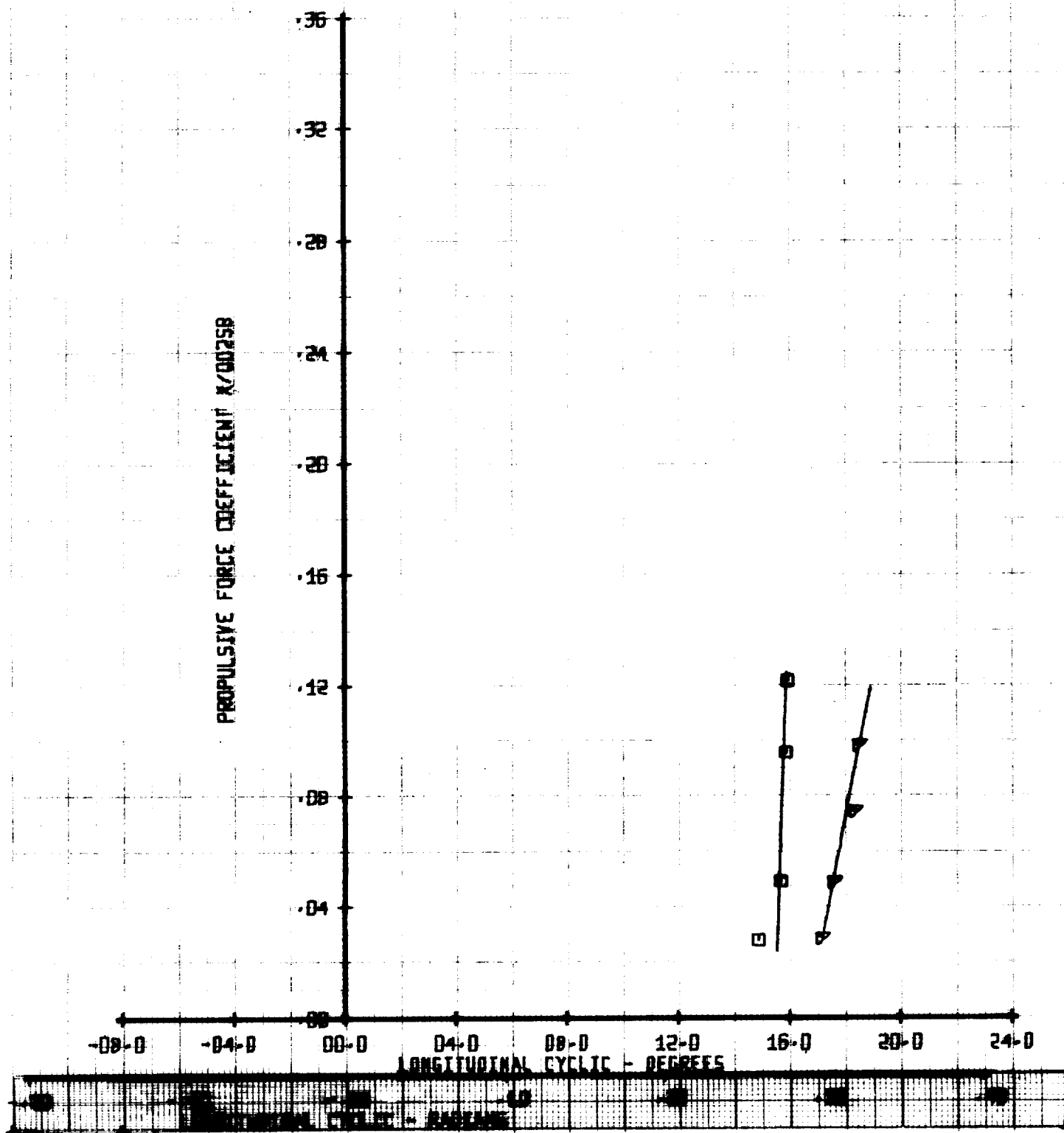


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT' / SB	VTUM
□	236	.57	06	358
△	237	.57	.076	358

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LONGITUDINAL CYCLIC

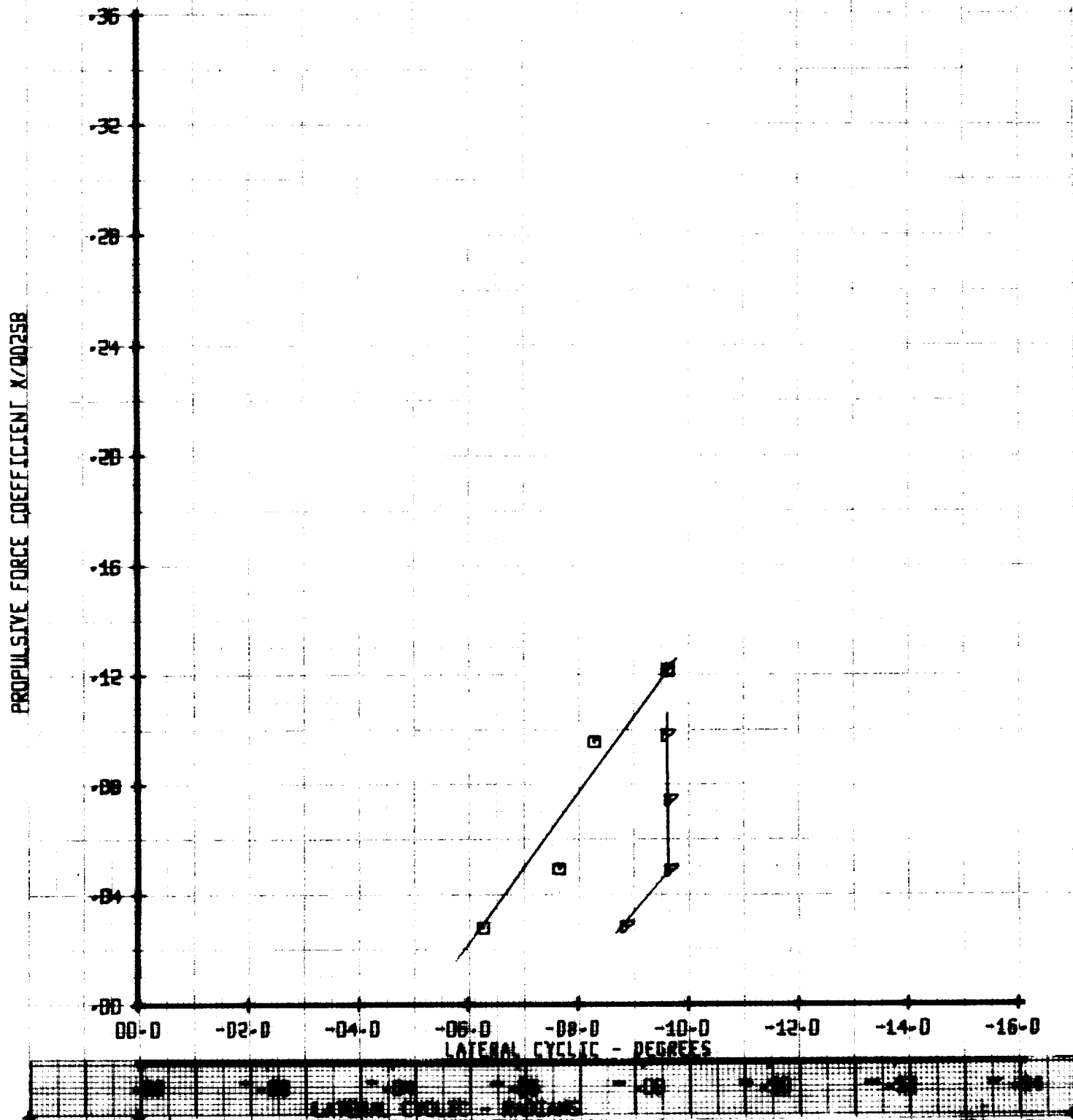


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU	CT/58	VTUN
□	236	.57	06	353
△	237	.57	.076	353

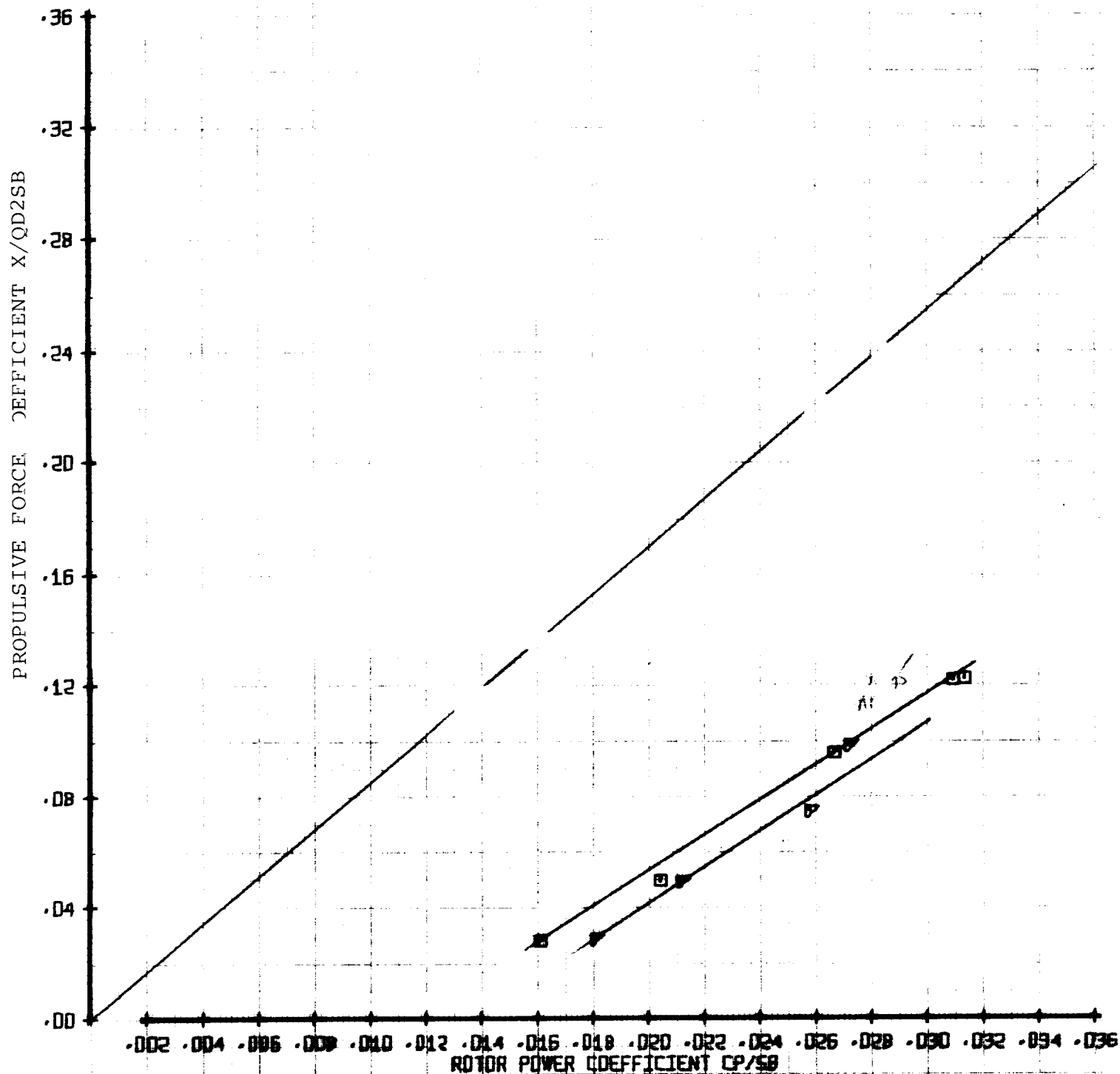
PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LATERAL CYCLIC



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM	RUN	MI'	CI' / SB	VTUM
Q	236	.57	06	353
P	237	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT

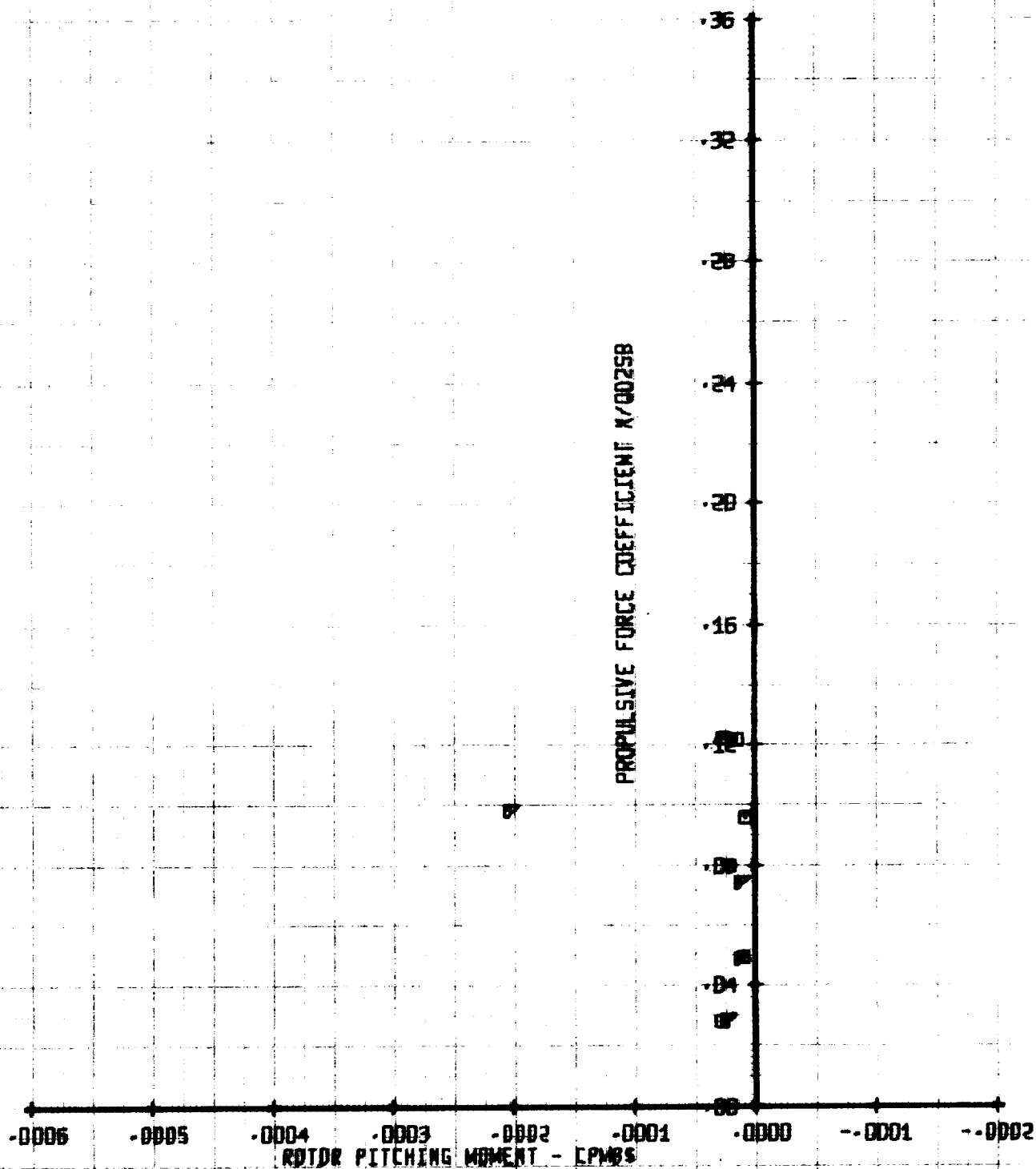


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT'/SB	VTUM
B	236	.57	.06	358
A	237	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PITCHING MOMENT

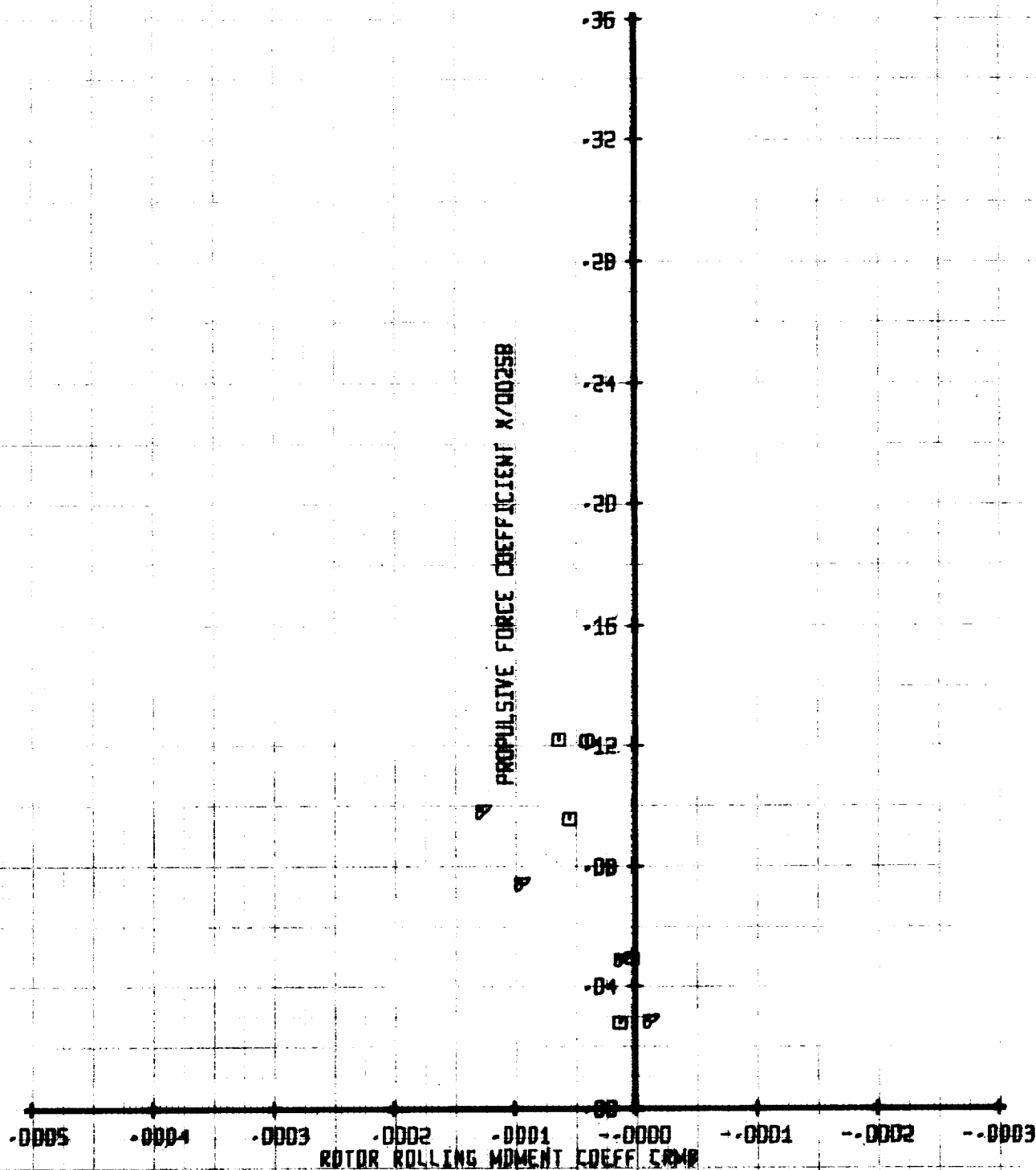


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU	CT/258	VTUM
□	236	.57	06	353
△	237	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR ROLLING MOMENT COEFFICIENT

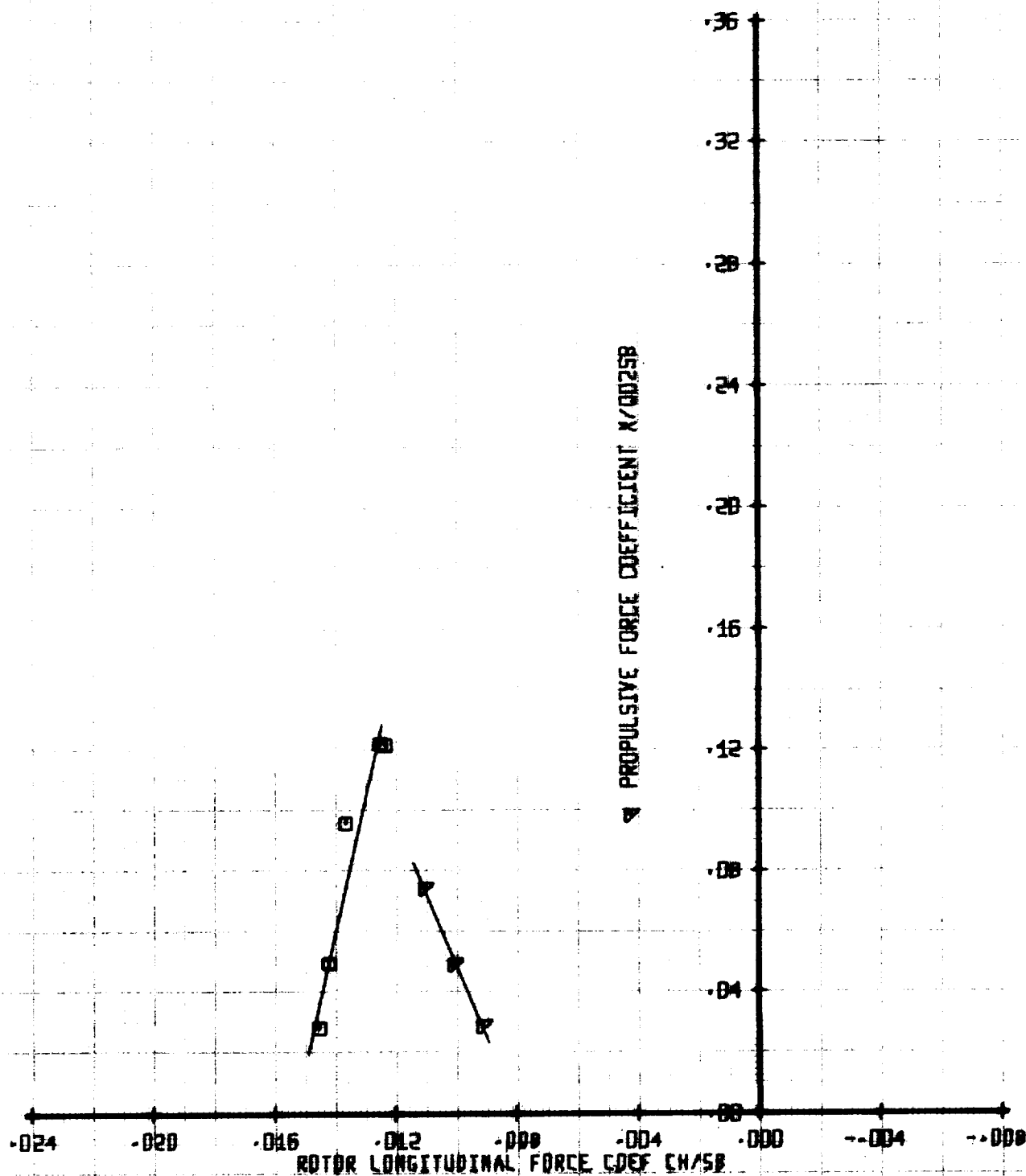


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VTUN
□	236	.57	06	353
△	237	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR LONGITUDINAL FORCE COEFFICIENT

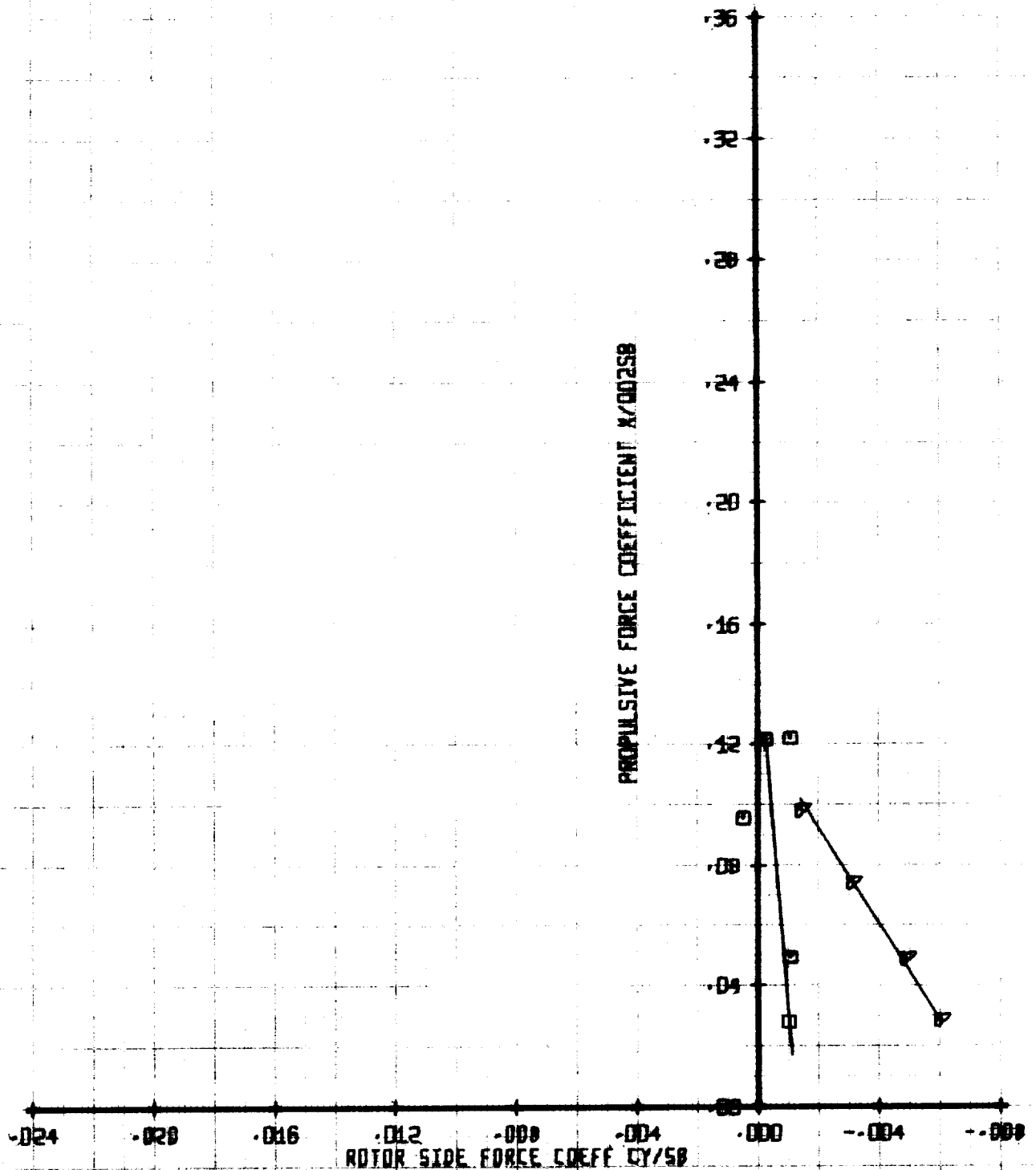


LEFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI	CT/58	VTUN
□	336	.57	.06	353
△	337	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR SIDE FORCE COEFFICIENT



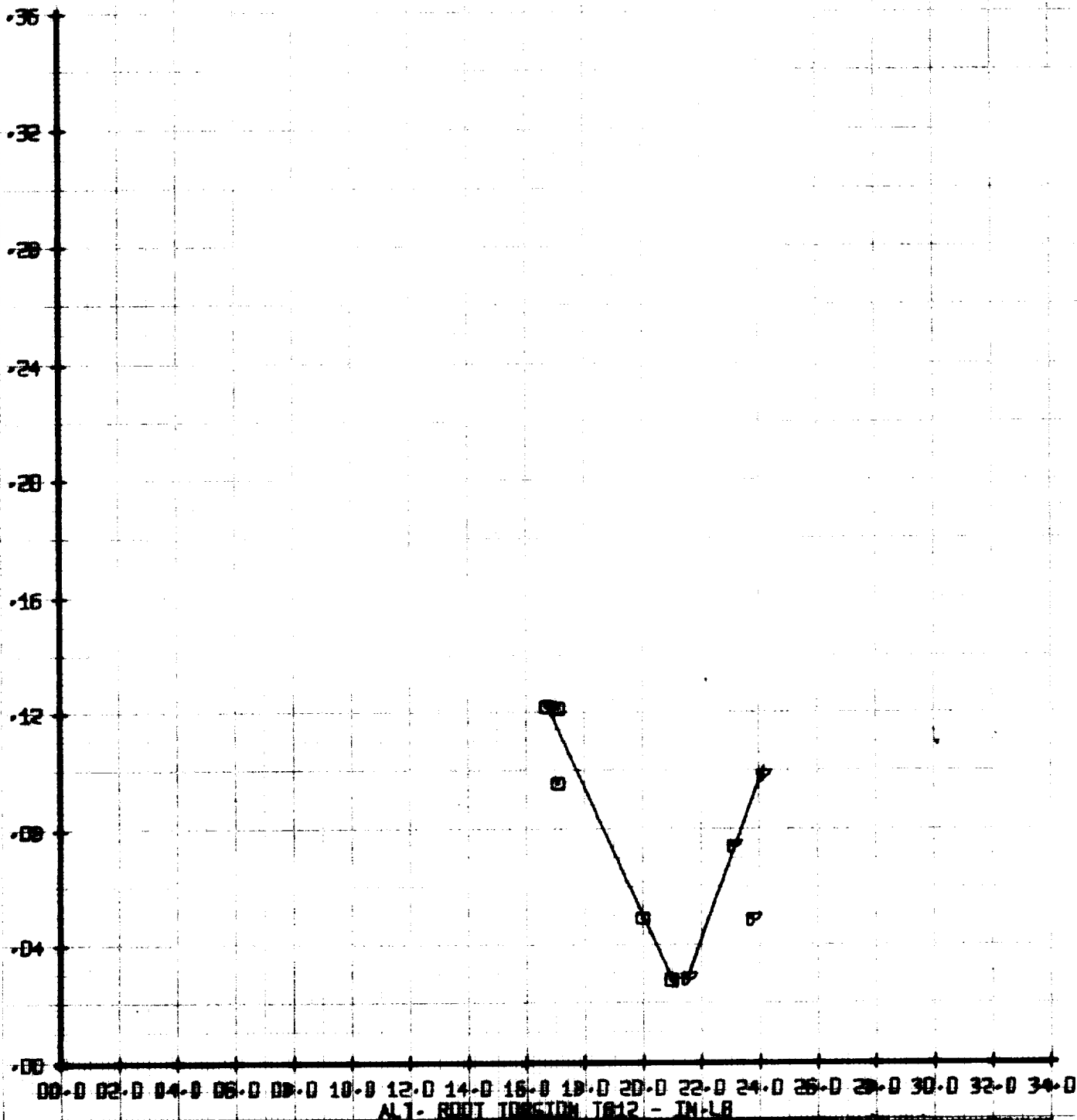
LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	VTUN
0	236	.57	06	353
4	237	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT TORSION TB12

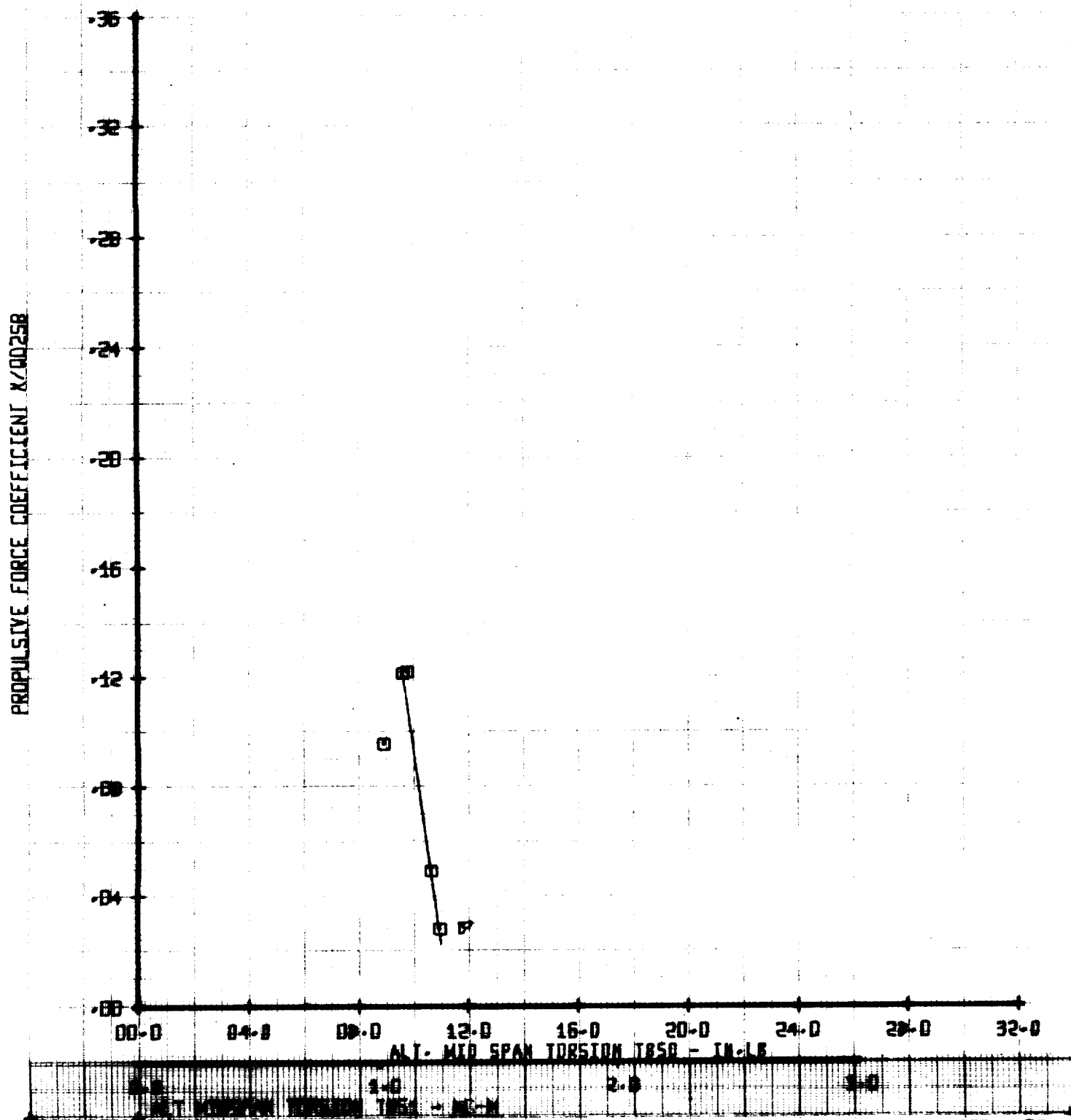
PROPULSIVE FORCE COEFFIC T X/00258



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND				
SYM	RUN	MU'	CT'/SB	VTUN
□	236	.57	06	353
□	237	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING MID SPAN TORSION TB50

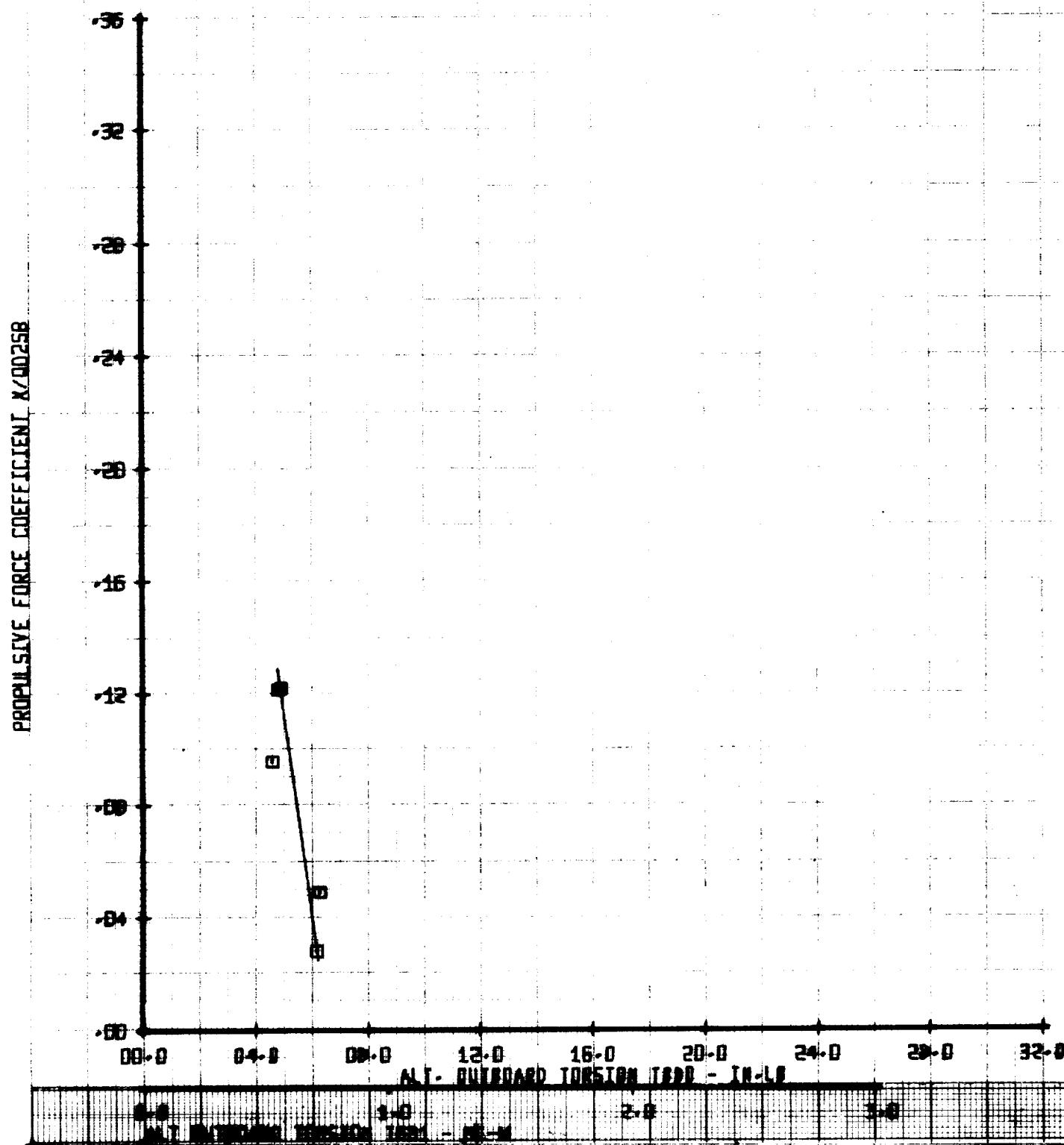


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / SB	VTUN
0	236	.57	06	353
0	237	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING OUTBOARD TORSION TB80

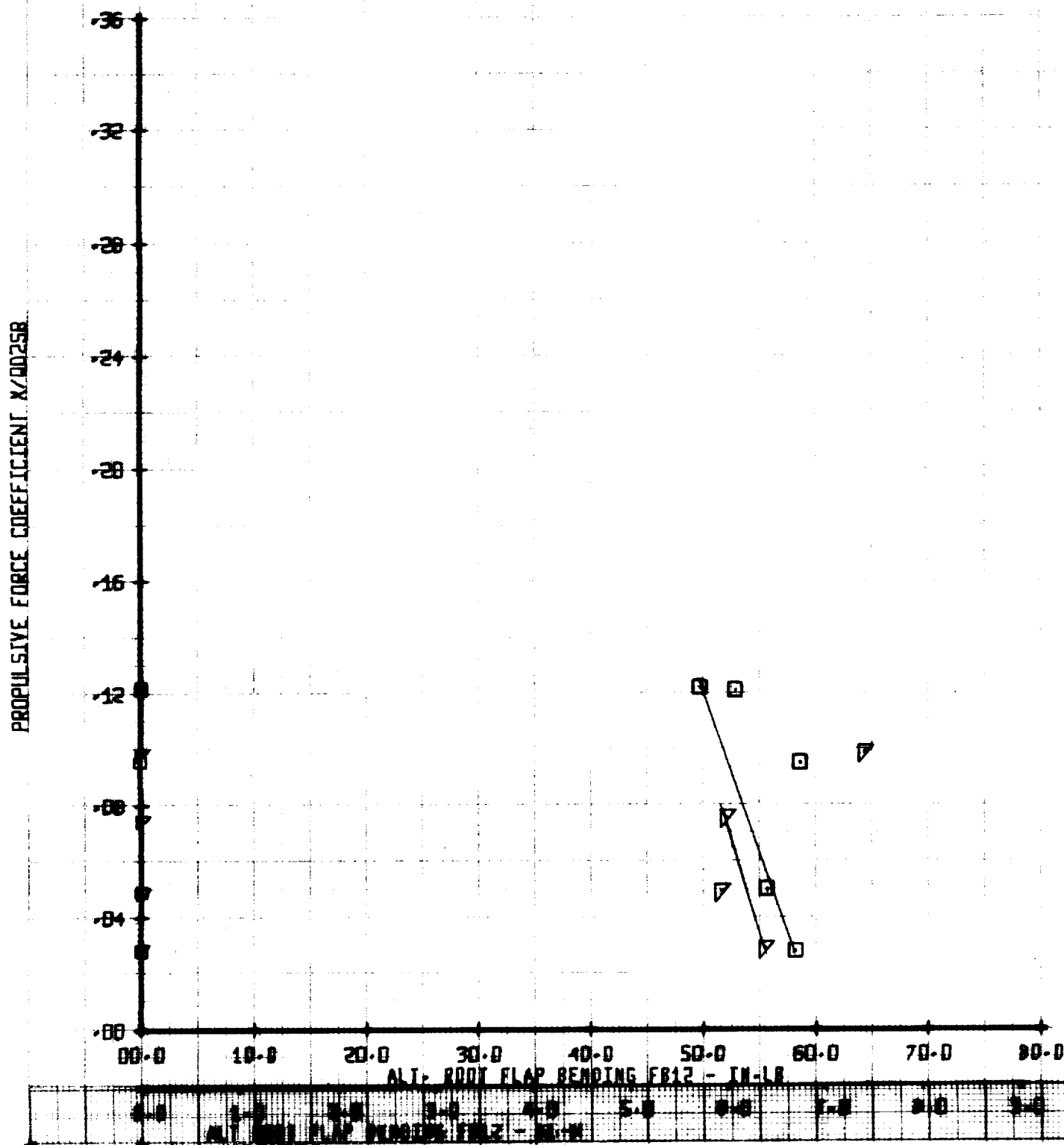


LEFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU	CT'/S8	VTUN
□	236	.57	06	353
▽	237	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

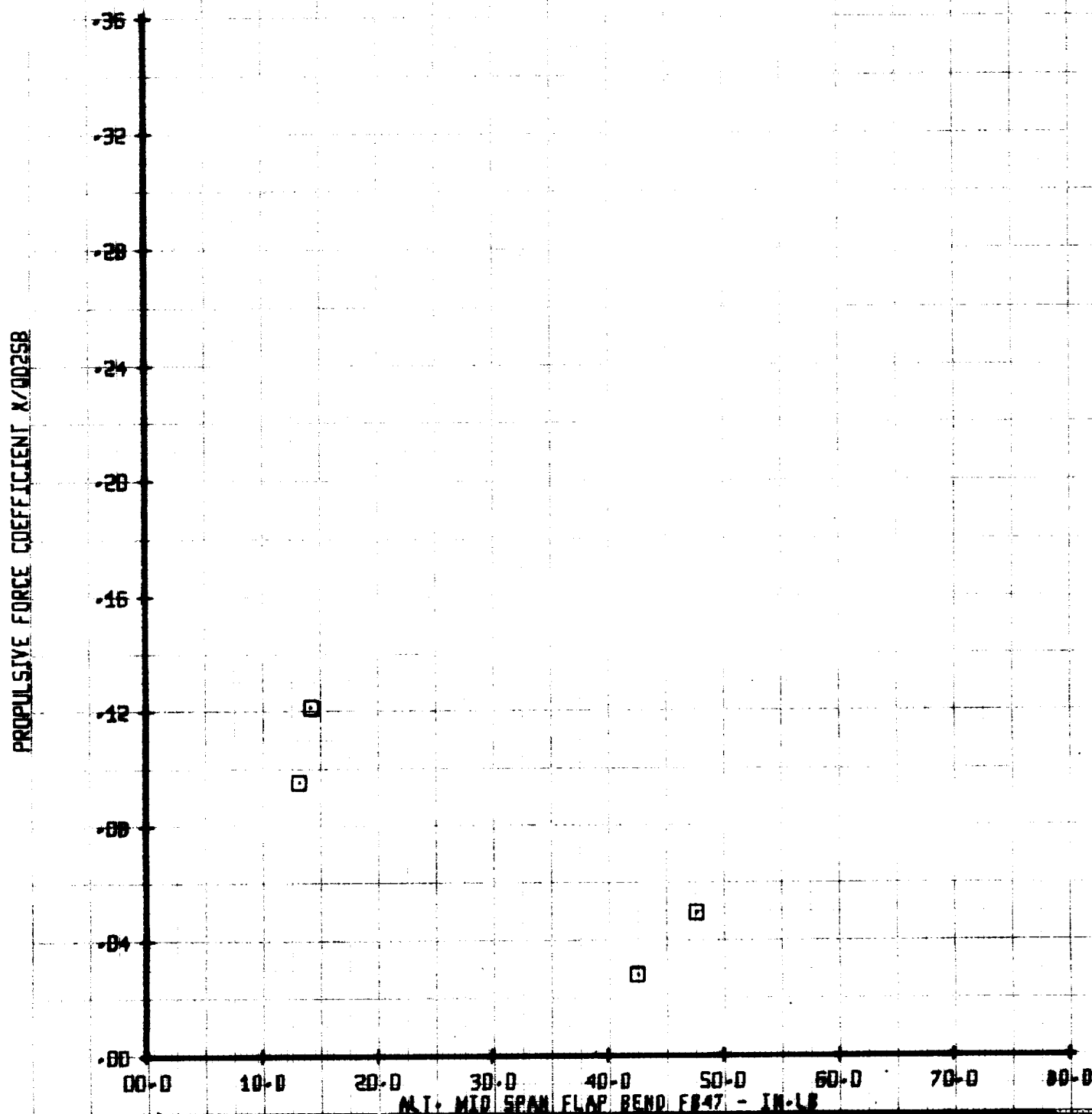


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'258	VTIN
0	236	.57	06	358
0	237	.57	.076	358

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING MID SPAN FLAP BENDING FB47



LEFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CM-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM
 0
 7

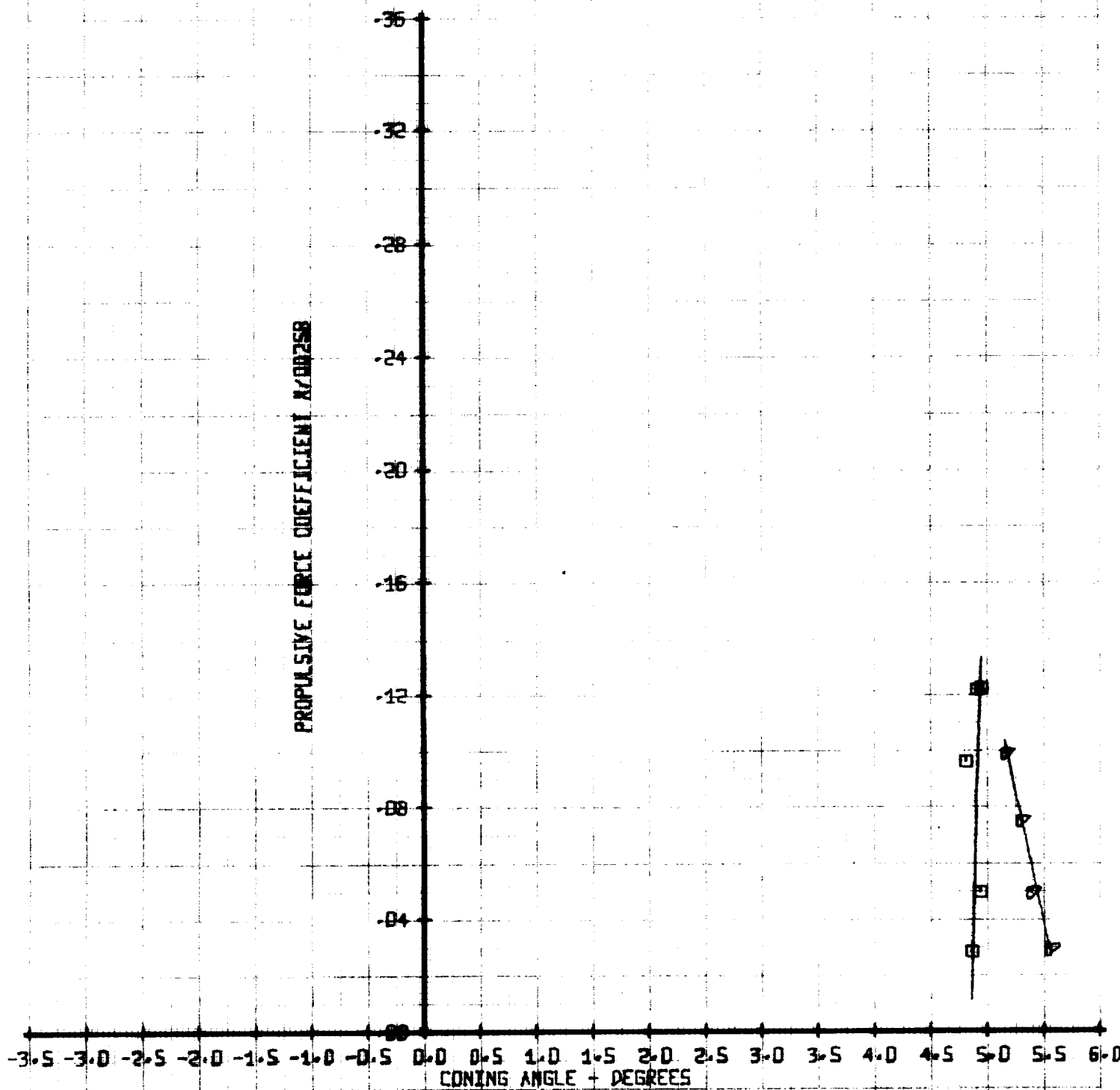
RUN
 236
 237

MLI
 .57
 .57

CT'758
 06
 .076

YTLN
 353
 353

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 CONING ANGLE

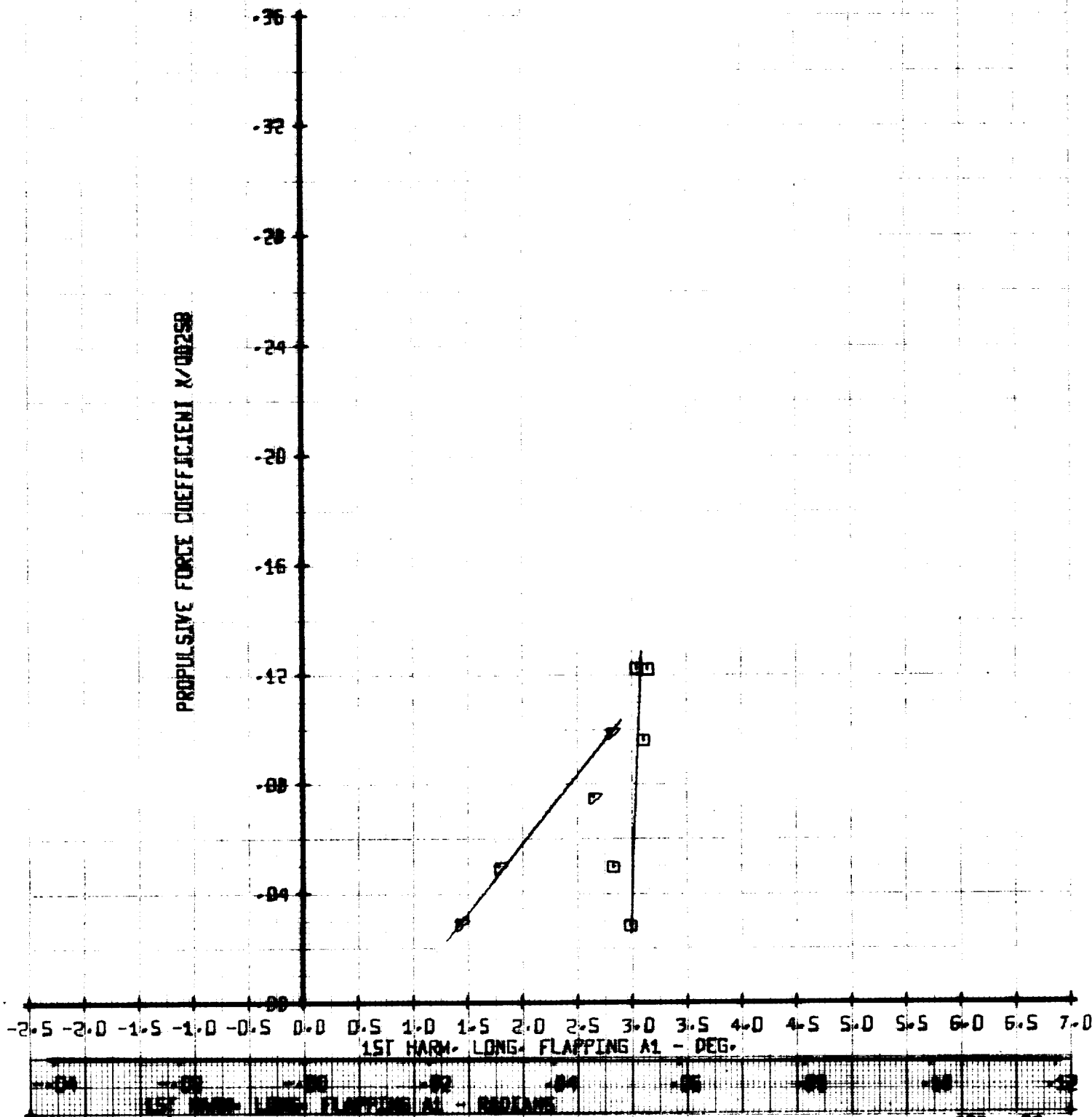


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	YIUN
□	236	.57	06	353
△	237	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 1ST HARMONIC LONGITUDINAL FLAPPING A1

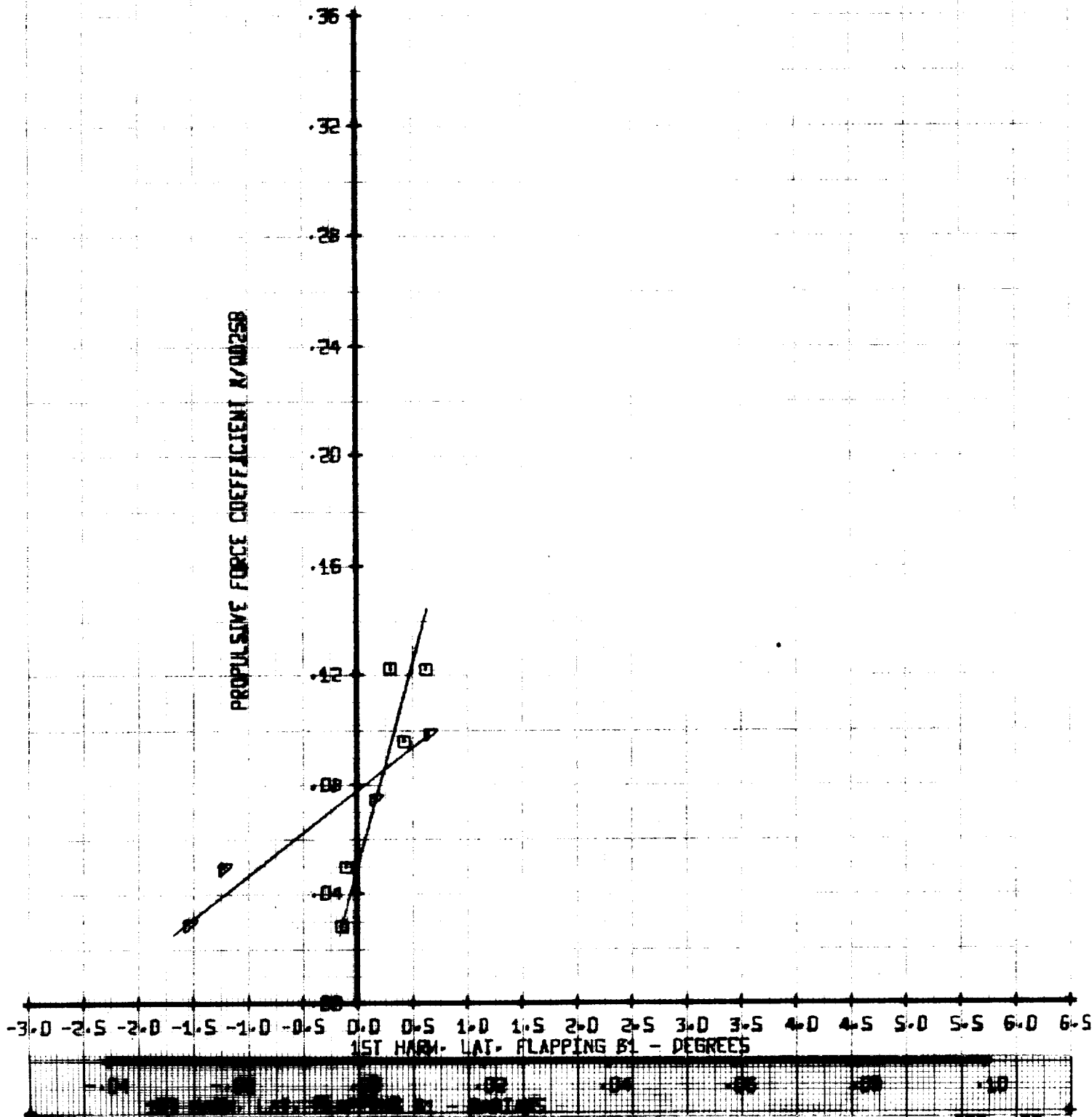


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MLI'	CT' / 58	YIUN
□	236	.57	.06	353
▽	237	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 1ST HARMONIC LATERAL FLAPPING B1

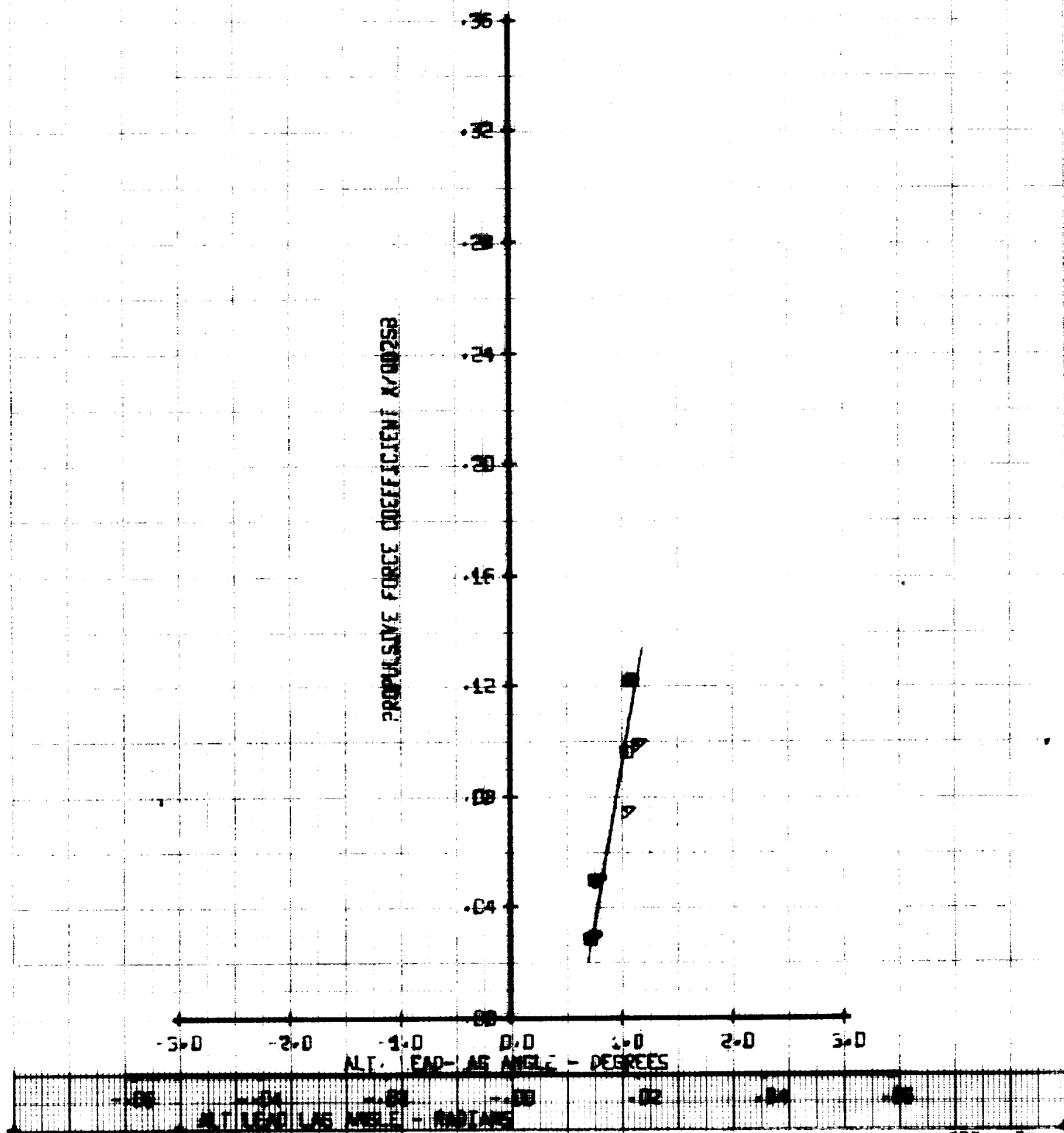


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	MIN	MI'	CT' 258	VT IN
0	236	.57	06	355
8	237	.57	.076	353

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING LEAD-LAG ANGLE

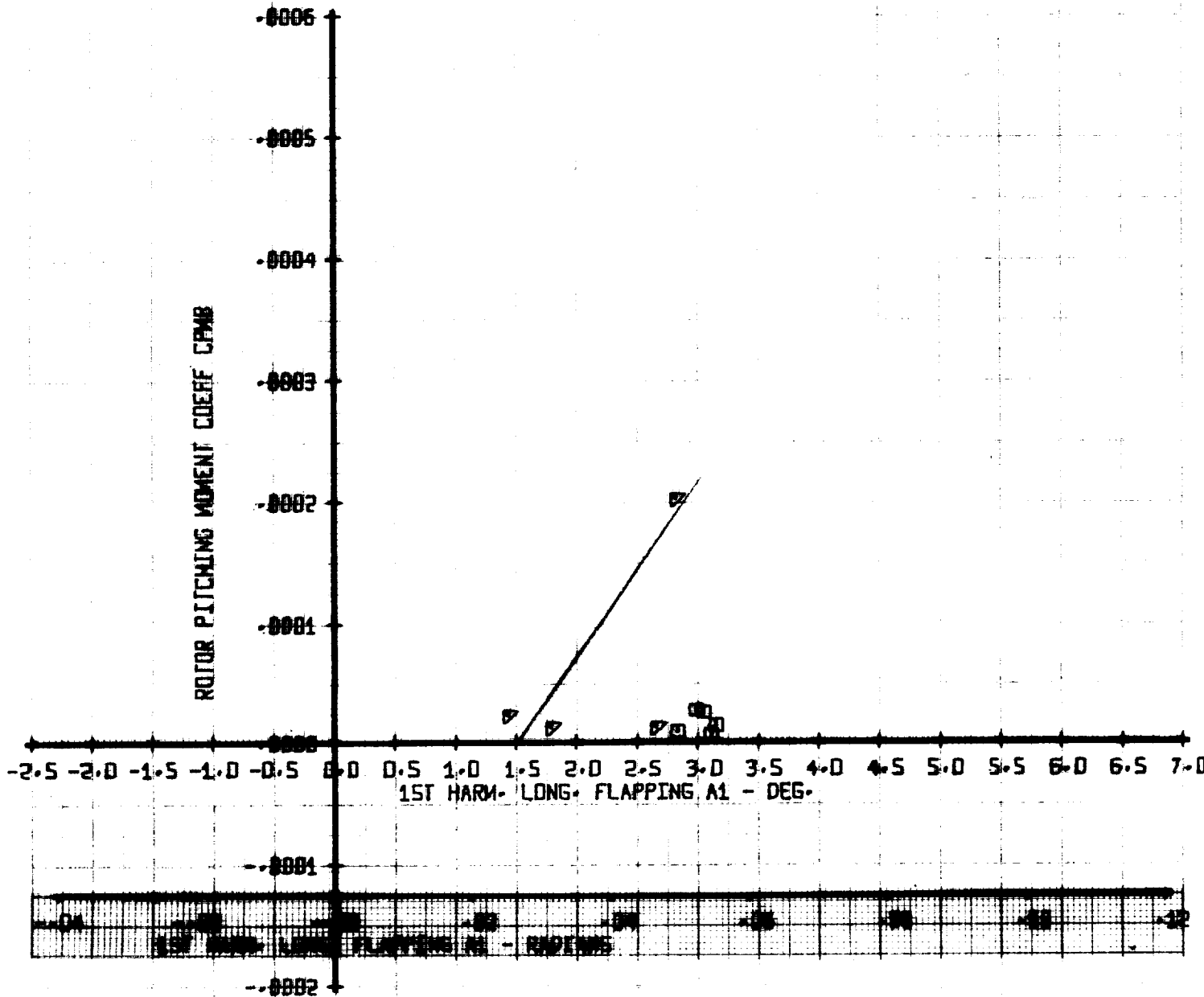


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML'	CT'/SB	YTUN
0	236	.57	.06	353
P	237	.57	.076	353

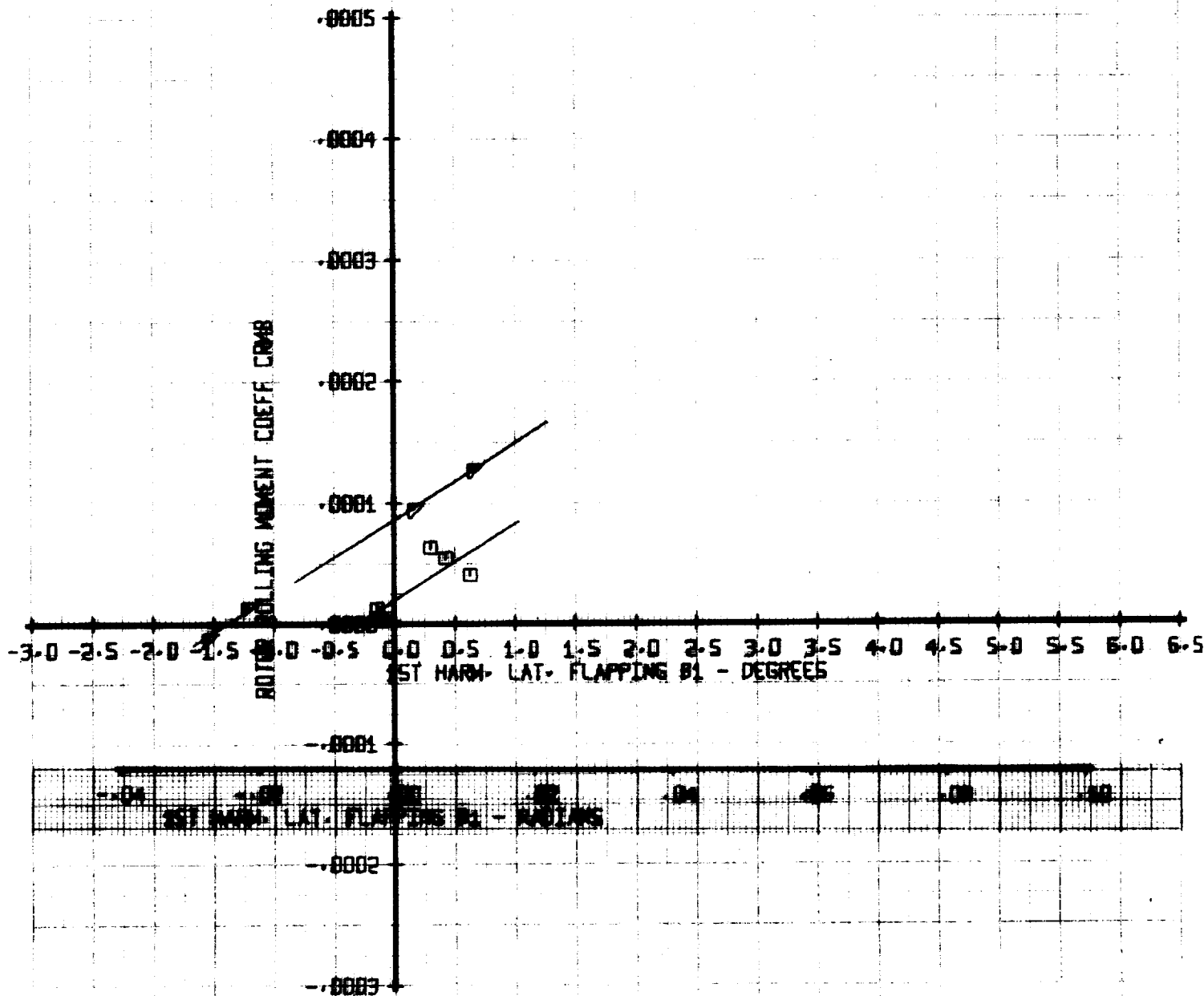
ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND		CT' / 58	YTDUM
SYM	RUN	MU'	
□	236	.57	353
○	237	.57	353

ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

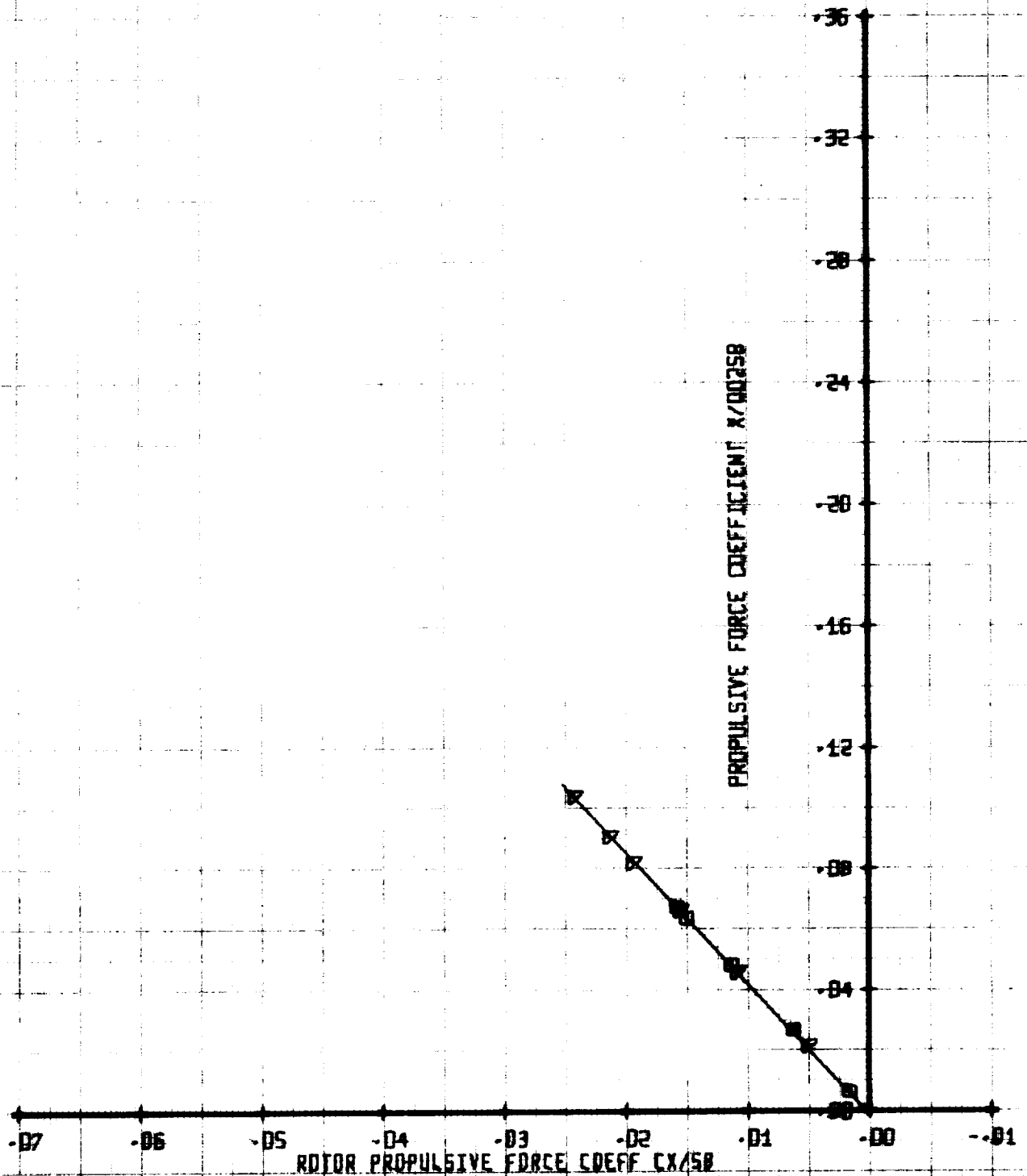


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	VTUM
0	239	.61	.04	370
4	238	.61	.055	370

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PROPULSIVE FORCE COEFFICIENT

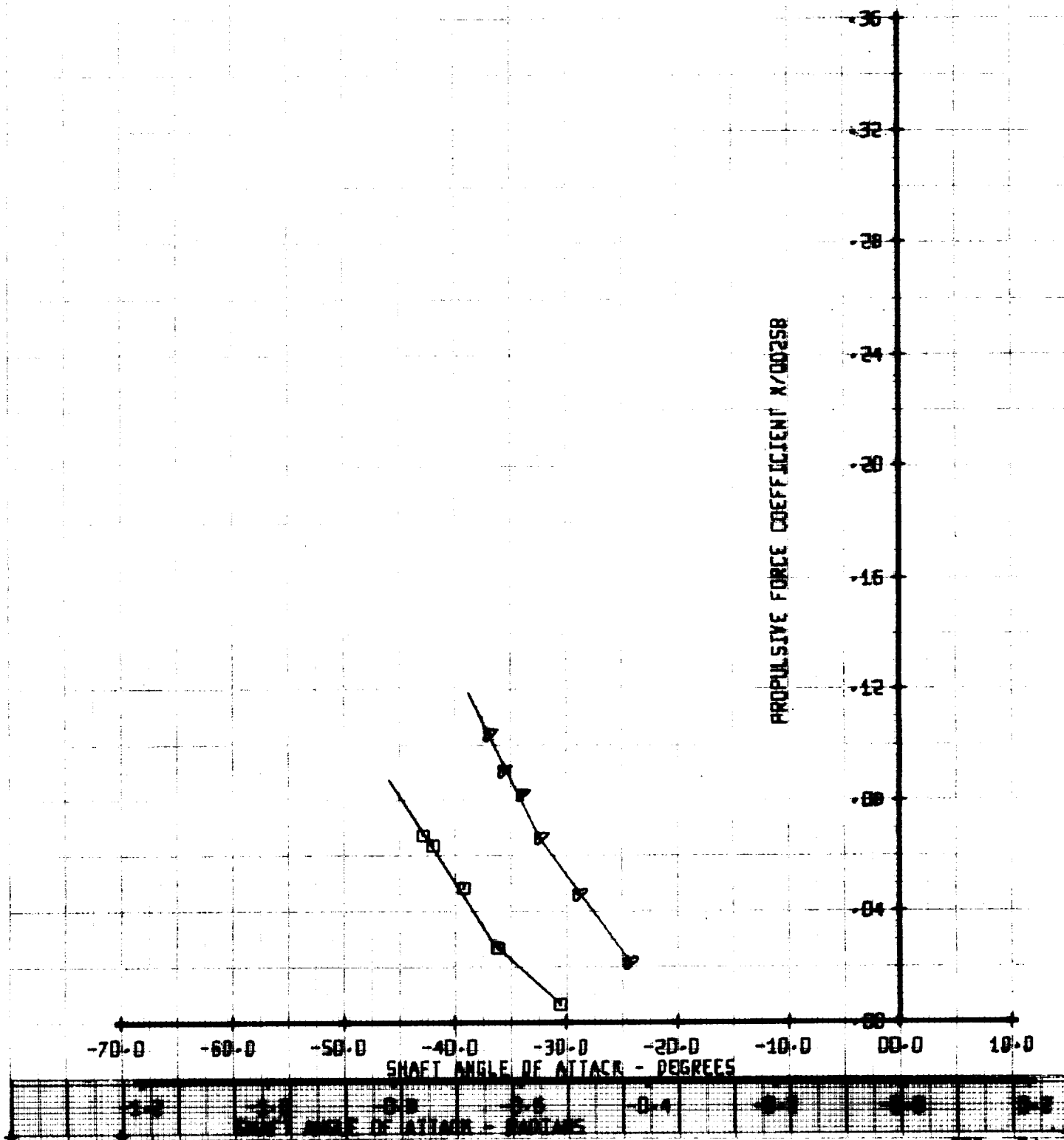


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML	CT/VSB	VTUN
P	239	.61	.04	370
	238	.61	.055	370

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 SHAFT ANGLE OF ATTACK

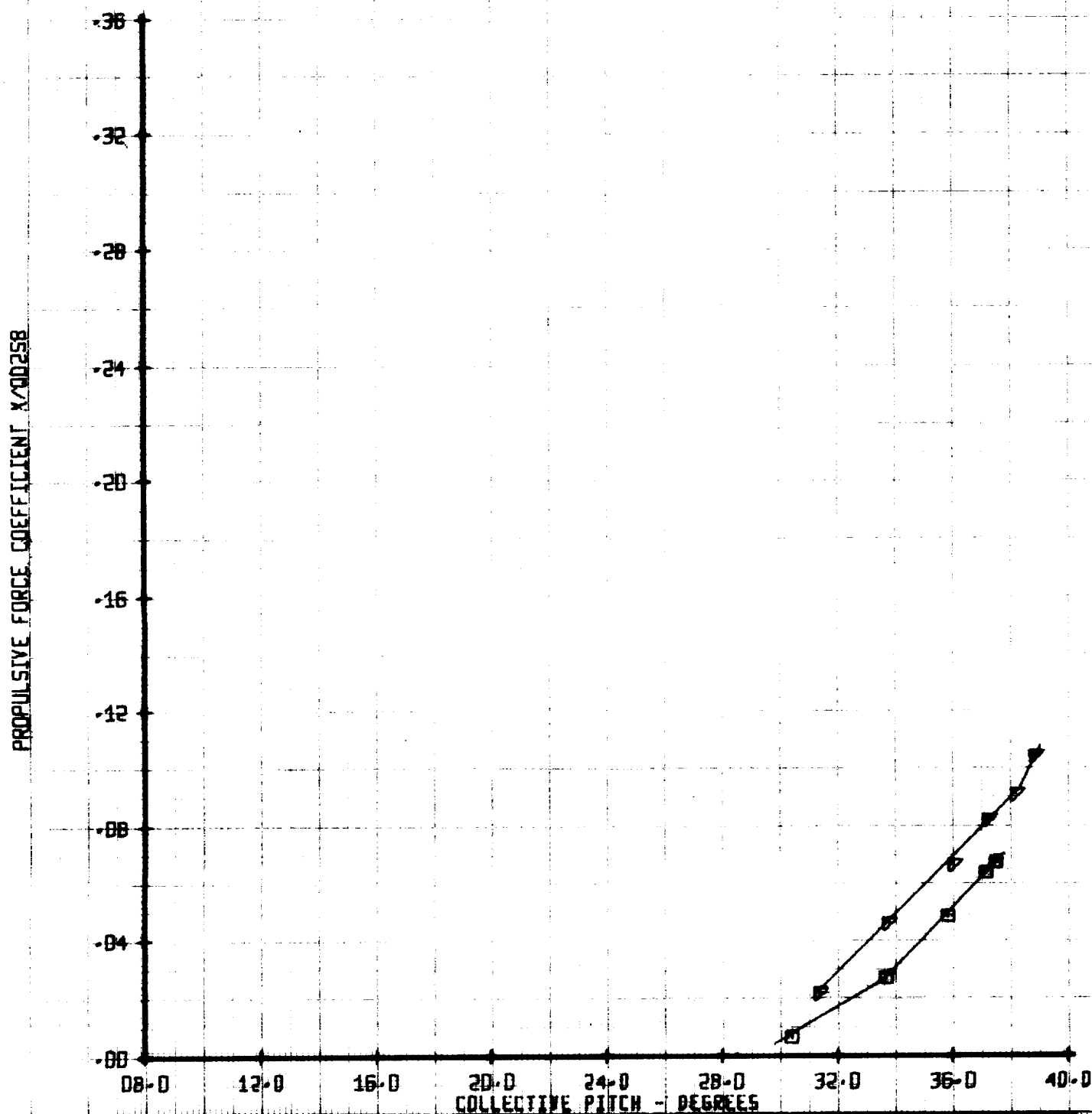


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VTUN
□	239	.61	.04	37B
▽	238	.61	.055	37B

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 COLLECTIVE PITCH

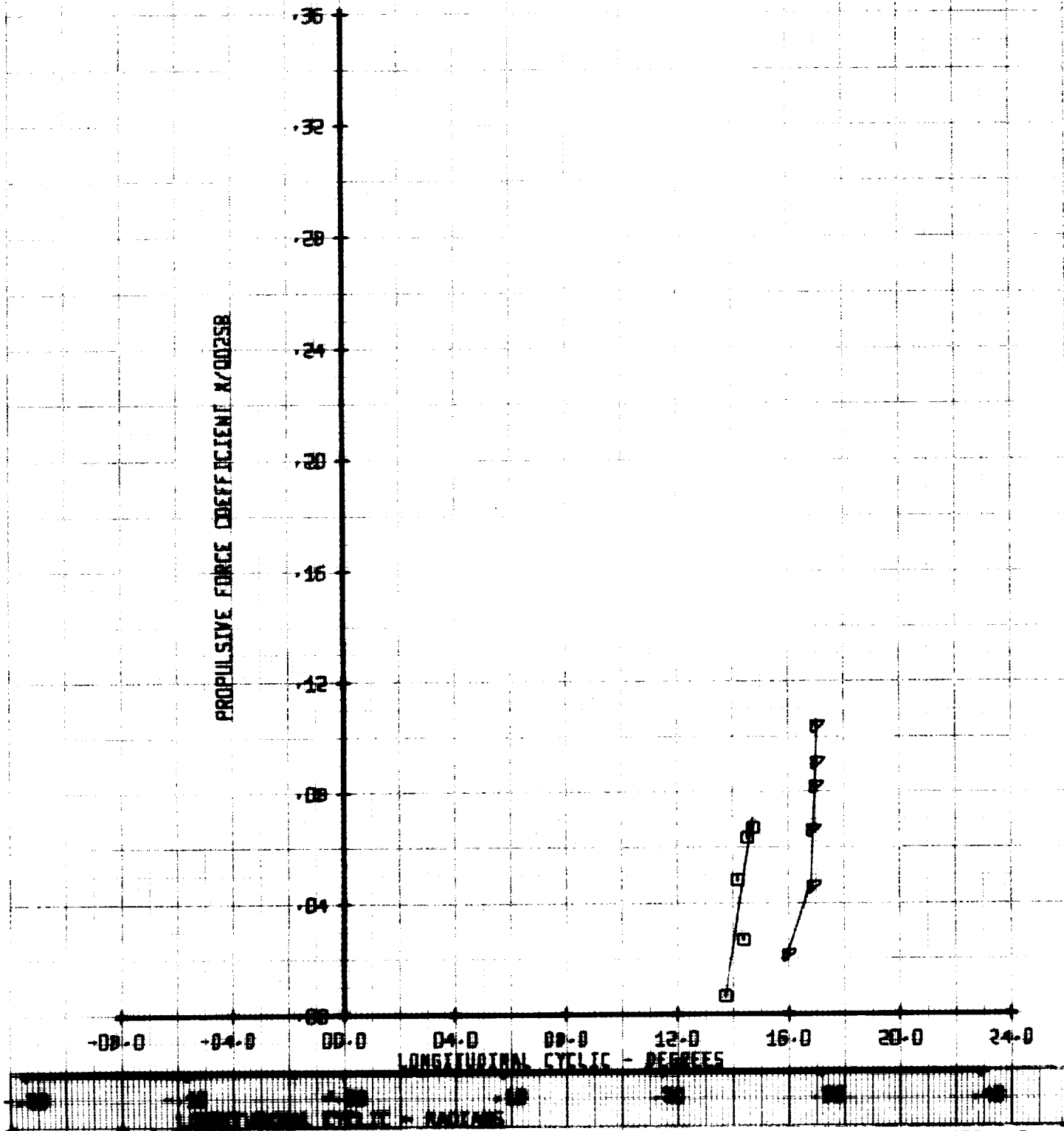


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VTUN
□	239	.61	.04	370
▽	238	.61	.055	370

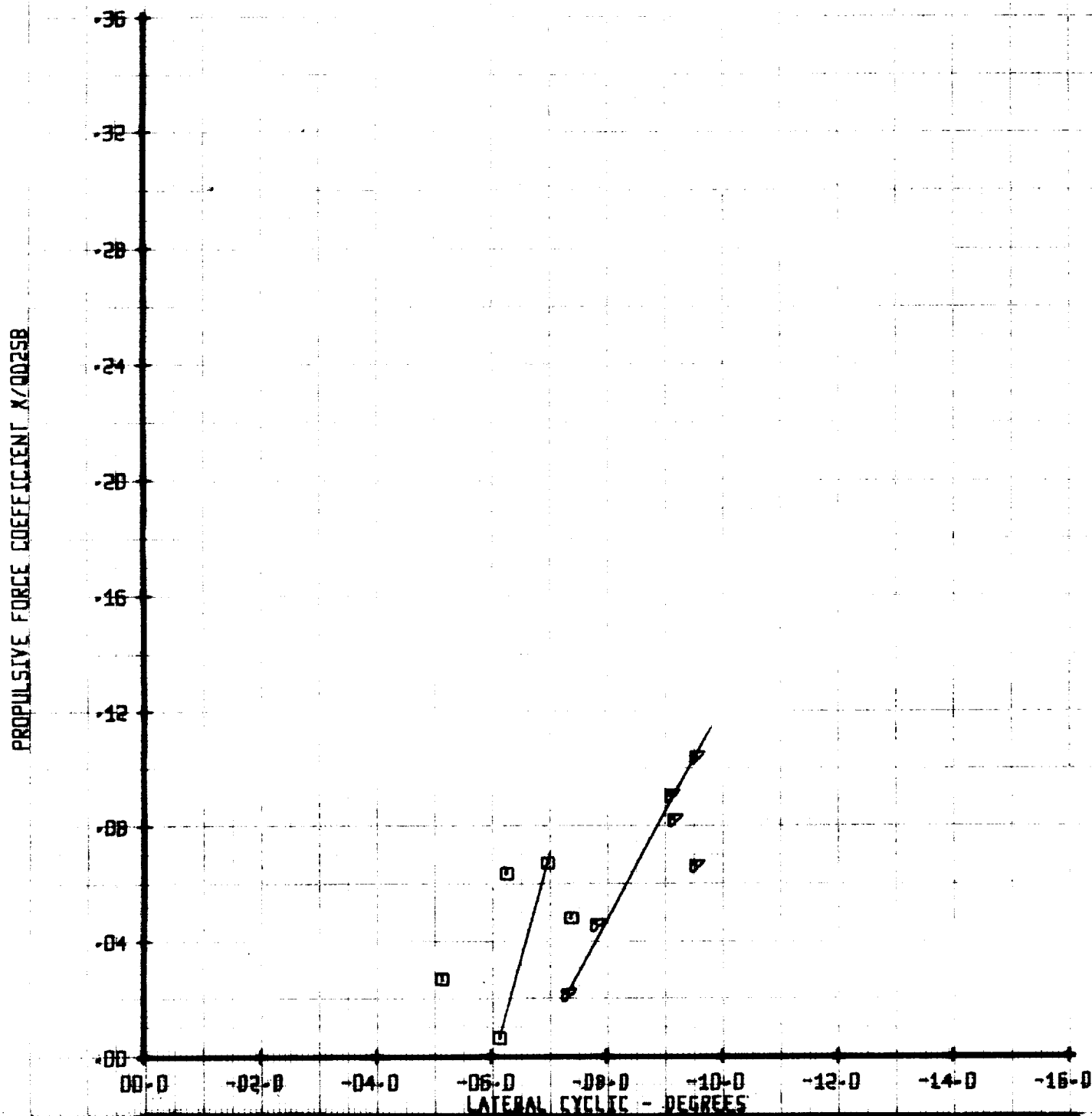
PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LONGITUDINAL CYCLIC



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND		CT/5B	VTUN
SYM	RUN		
□	239	.61	37B
△	238	.61	37B

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LATERAL CYCLIC



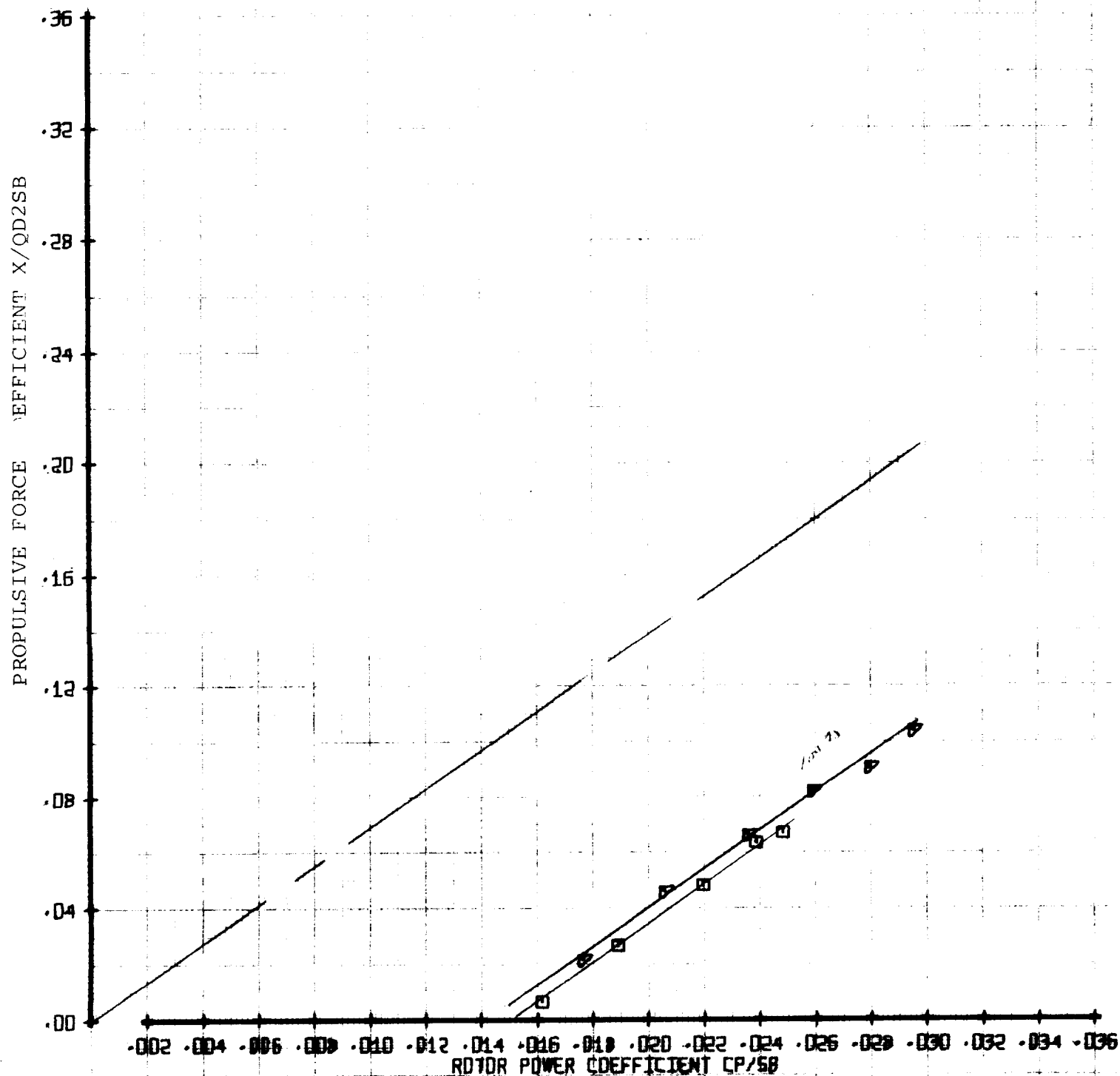
LATERAL CYCLIC - INCHES

SET 54
 BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

		LEGEND			
SYM	RUN	MU'	CT'/SB	VTUN	
□	239	.61	.04	37B	
●	238	.61	.055	37B	

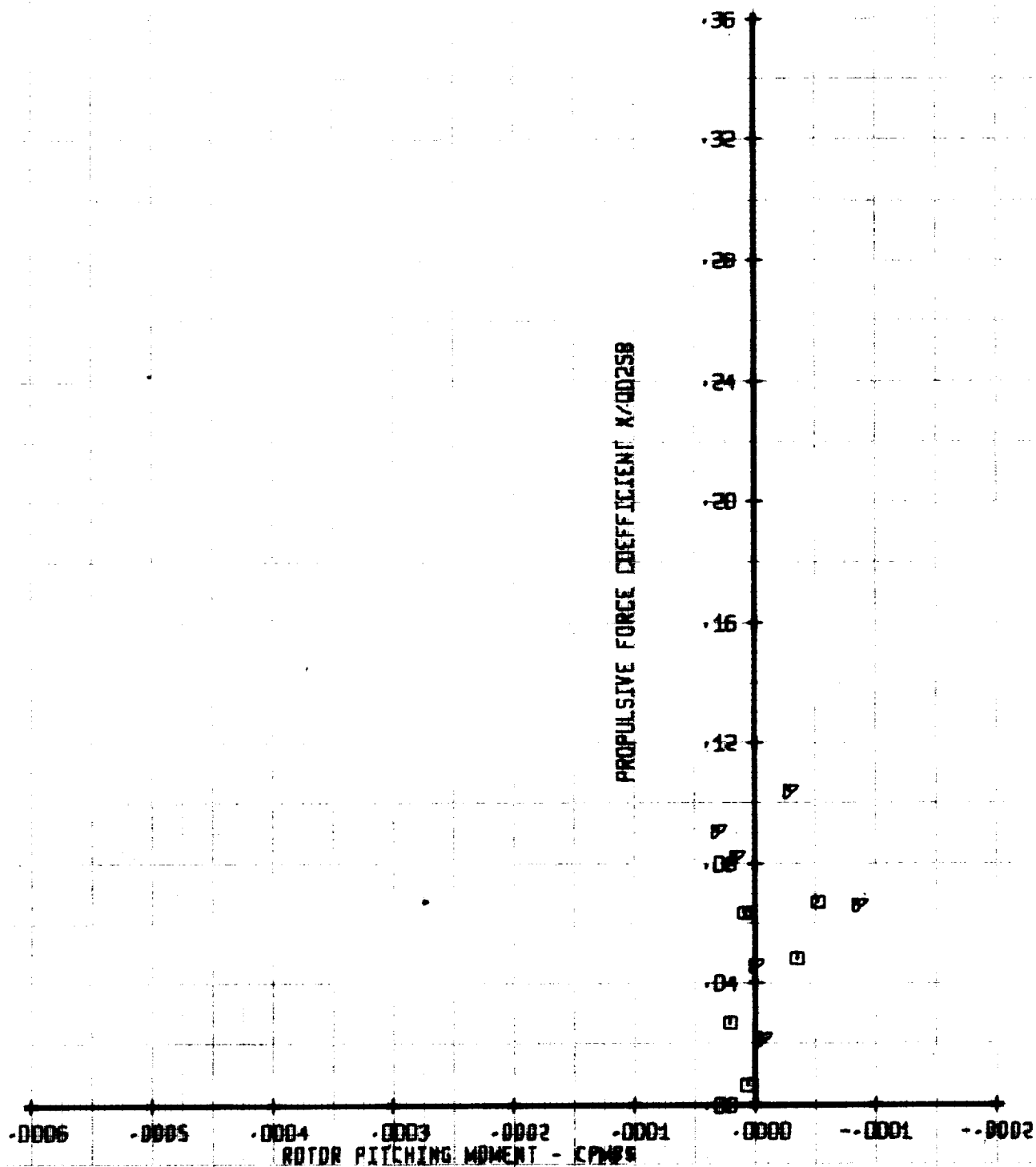
PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND		CT'/SB	YDUN
SYM	RUN	MU'	
□	239	.61	37B
△	238	.61	37B

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

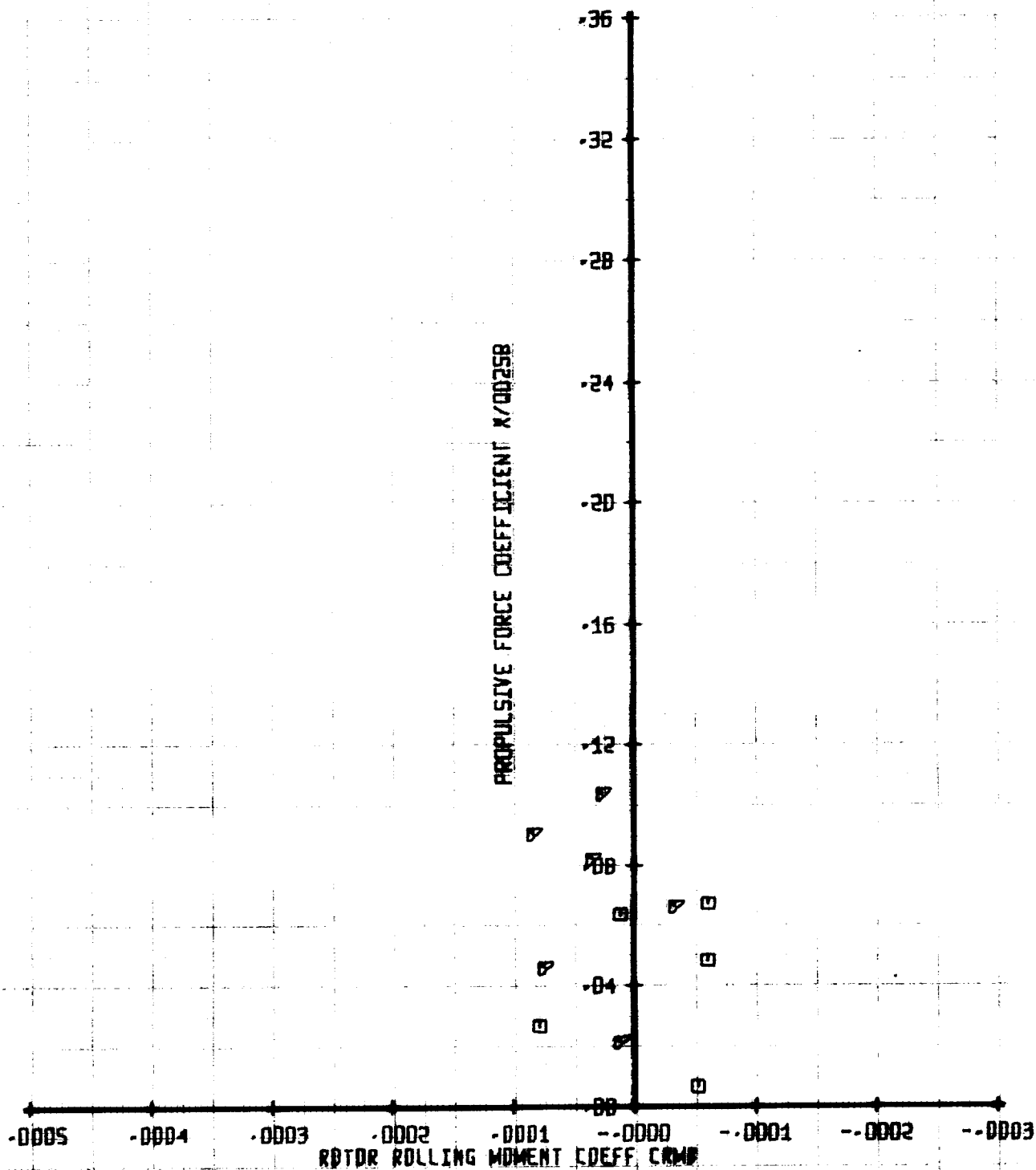


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'Y58	VTUN
90	239	.61	.04	370
90	230	.61	.055	370

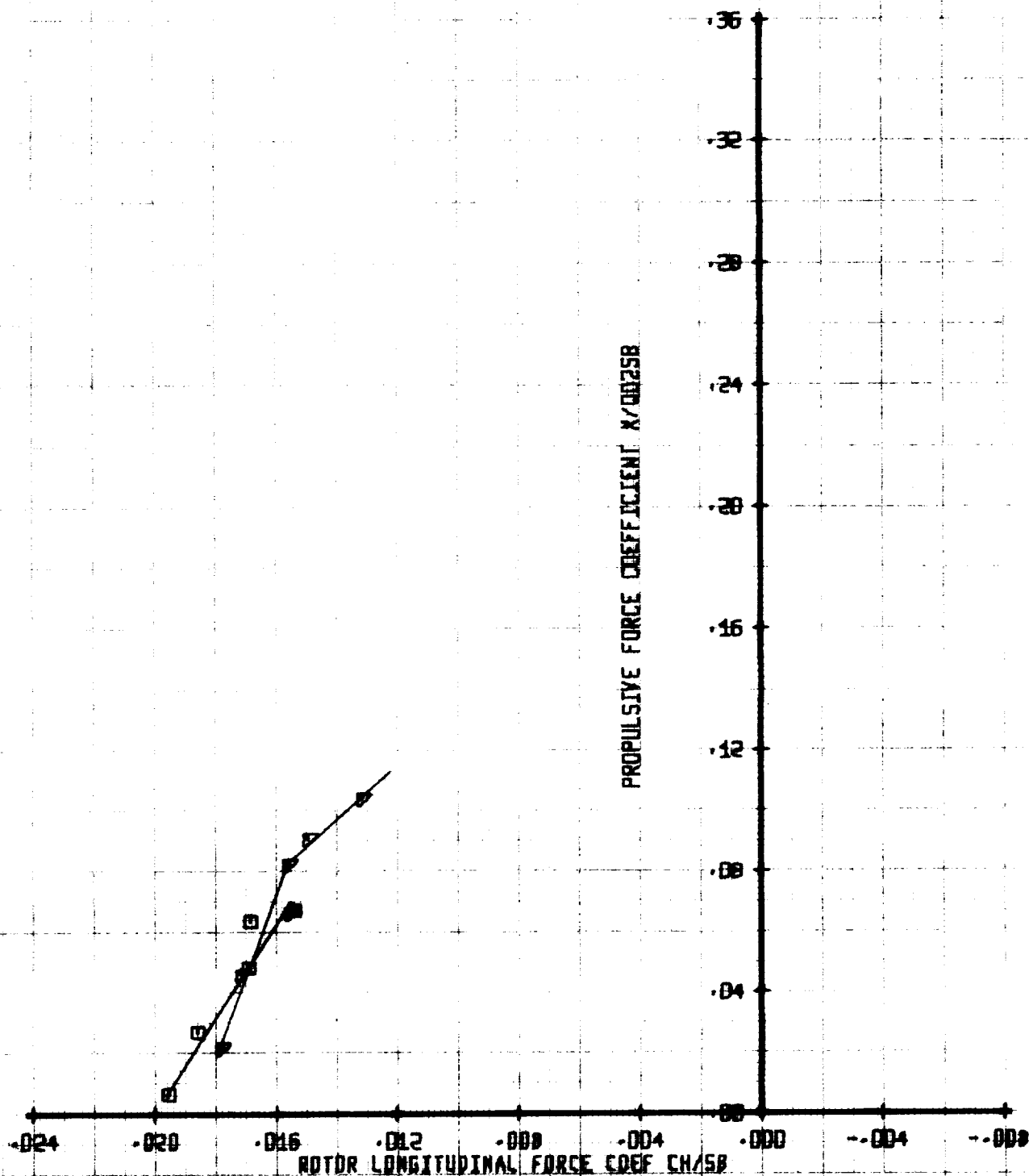
PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR ROLLING MOMENT COEFFICIENT



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

SYM		RUN		LEGEND		MU'		CT'/SB		VTUN	
0	0	239	238			.61	.61	.04	.055	370	370

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR LONGITUDINAL FORCE COEFFICIENT

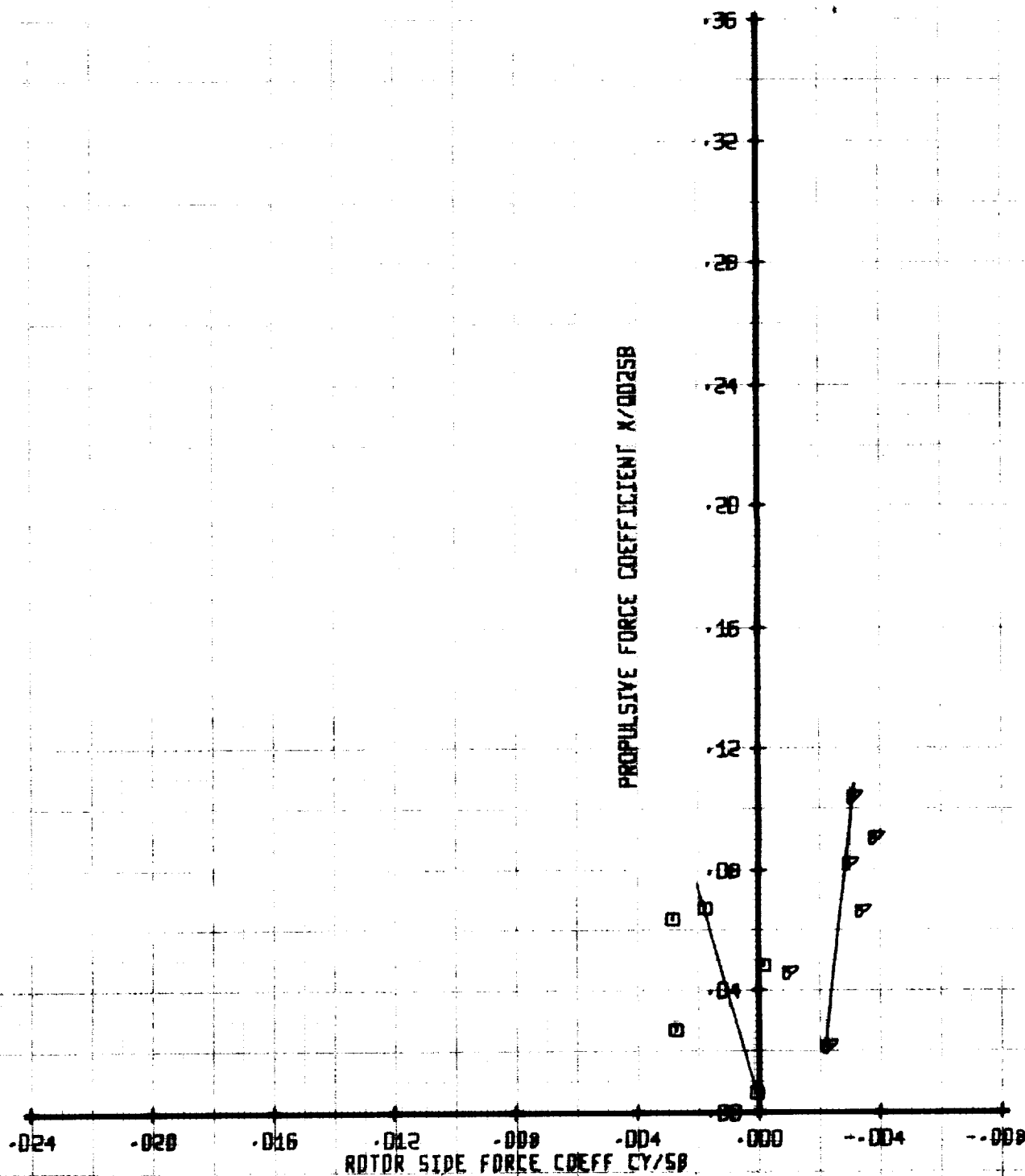


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VTUN
□	239	.61	.04	37B
▽	238	.61	.055	37B

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR SIDE FORCE COEFFICIENT

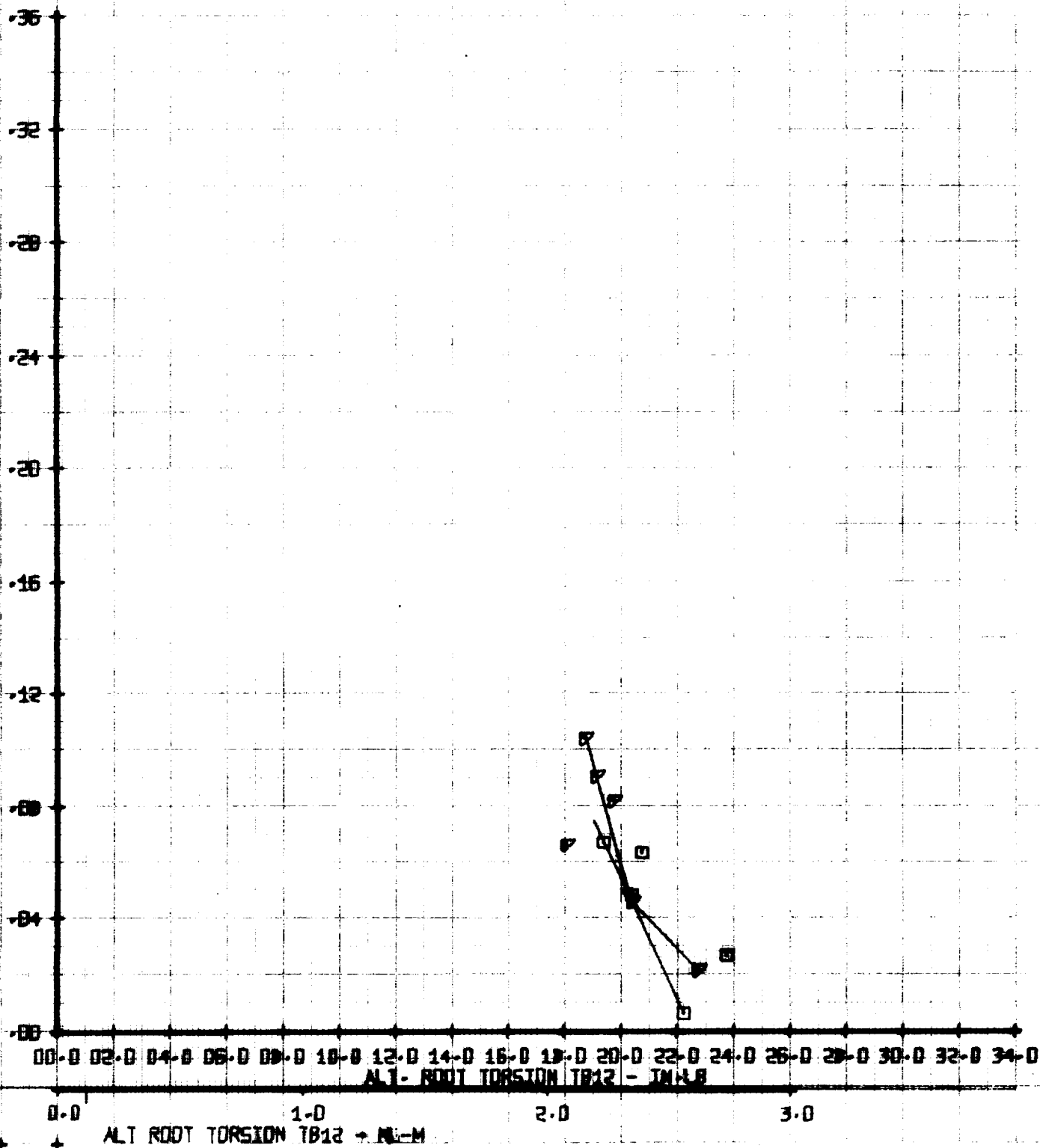


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND		MI'	CT' / 58	VTUM
SYM	RUN	.61	.04	378
□	239	.61	.055	378

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING ROOT TORSION TB12

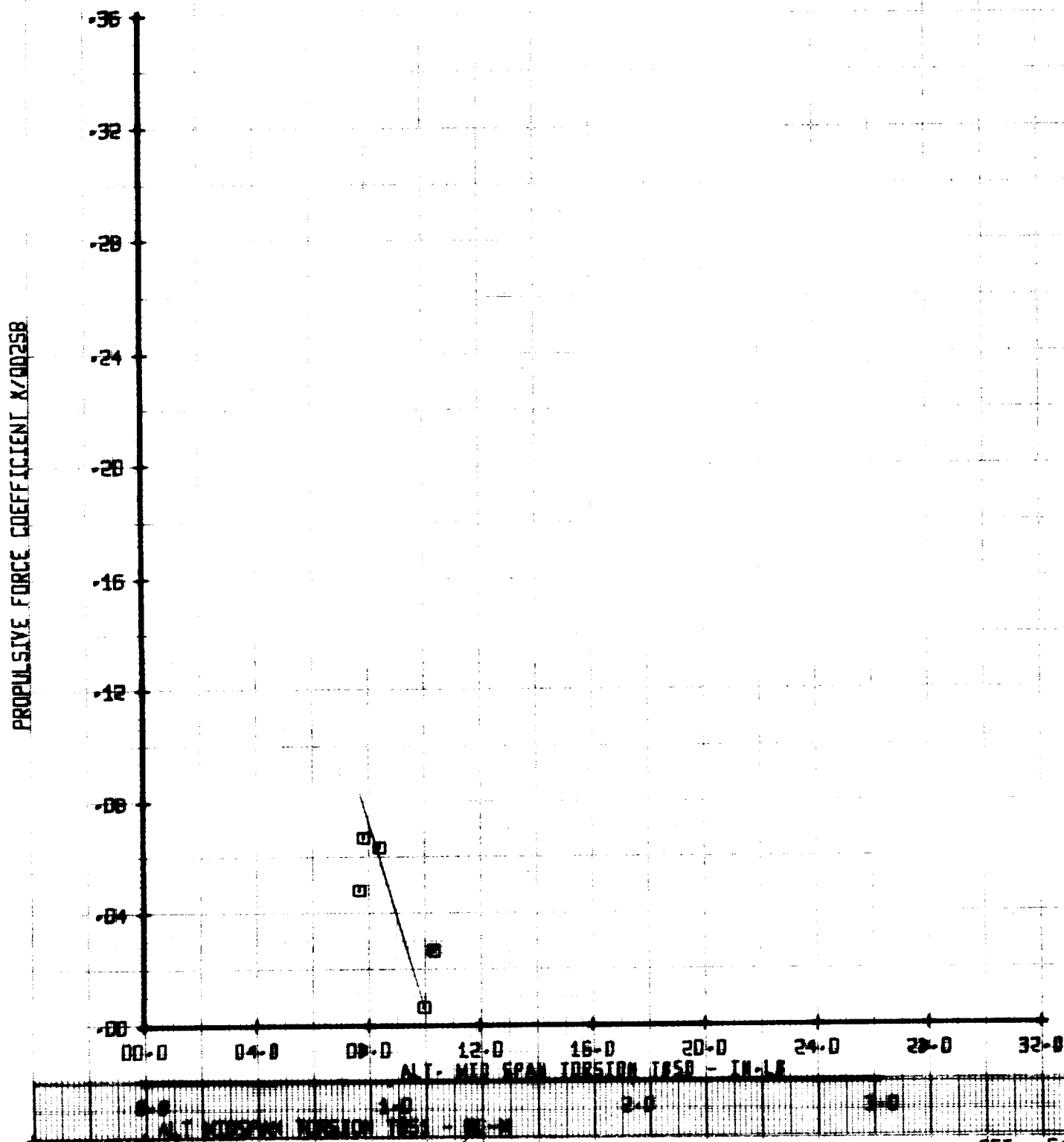
PROPULSIVE FORCE COEFFIC T X/00258



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND				
SYM	RUN	MU'	CT'/SB	VTUN
□	239	.61	.04	37B
○	238	.61	.055	37B

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING MID SPAN TORSION TB50

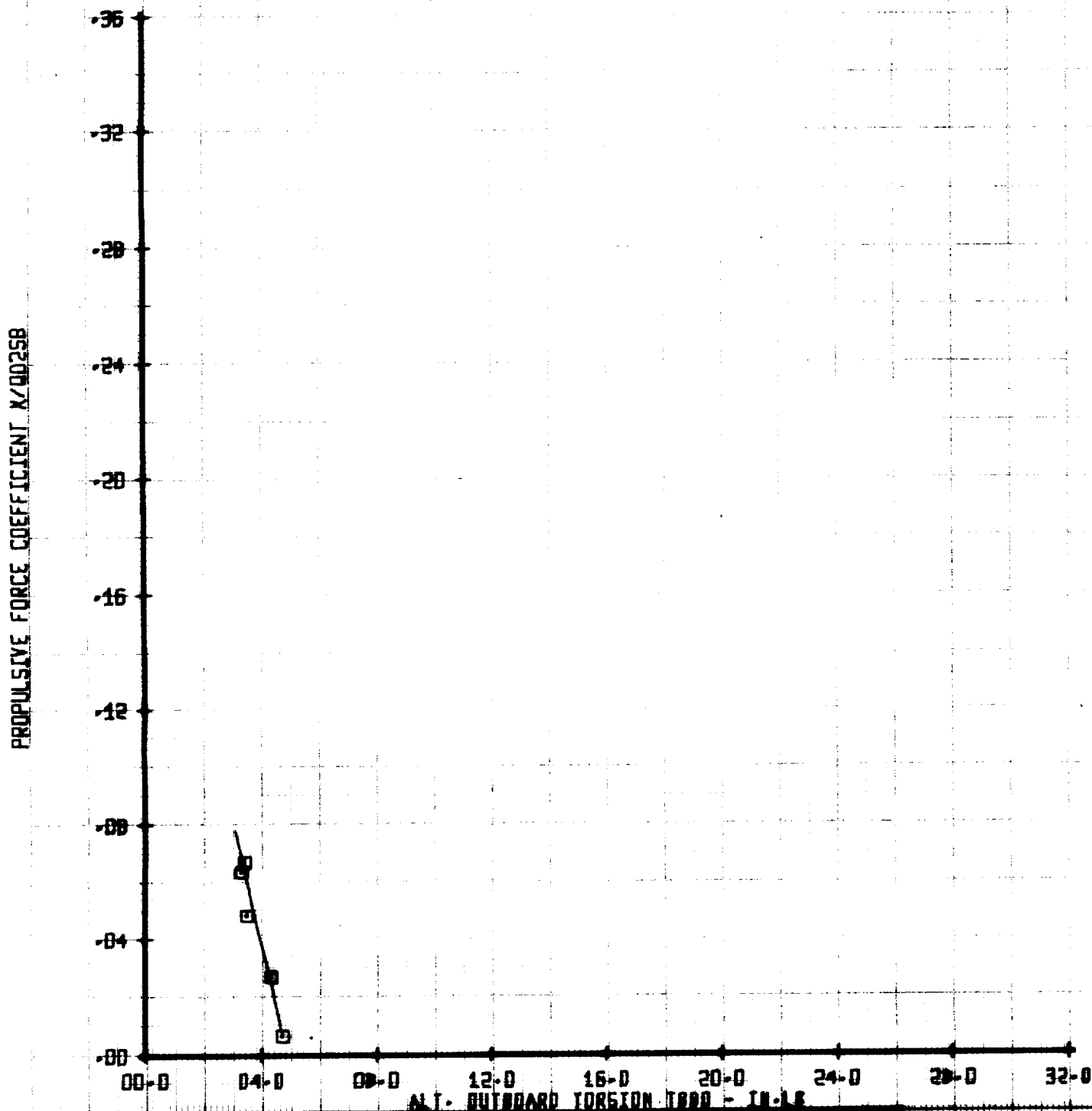


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / SB	VTUN
□	239	.61	.04	37B
○	238	.61	.055	37B

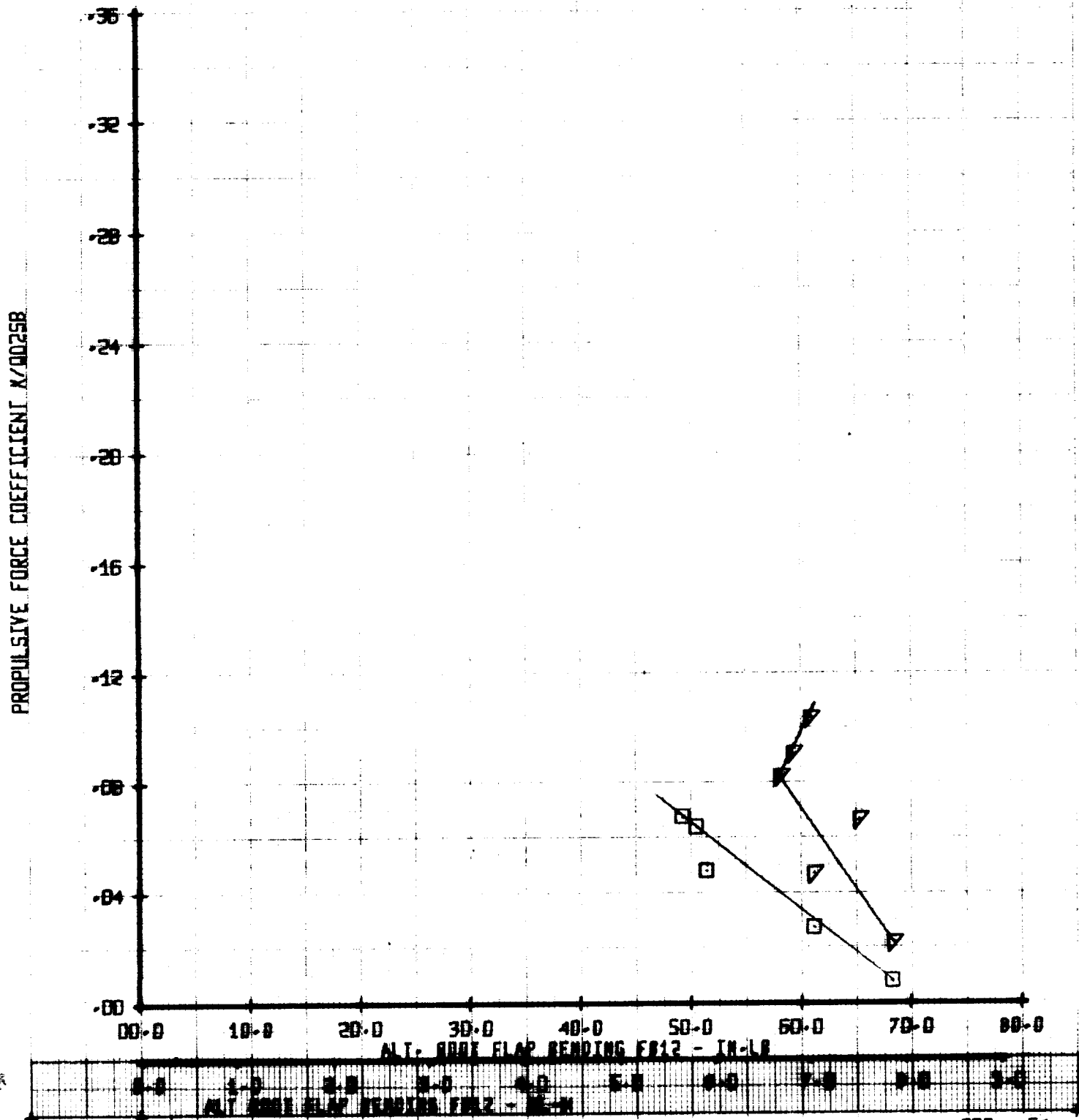
PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING OUTBOARD TORSION TB80



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

SYM		RUN		LEGEND		CT' / SB		VTUN	
□	▽	239	238	MI'		.04	.055	370	370
				.61					
				.61					

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING ROOT FLAP BENDING FB12

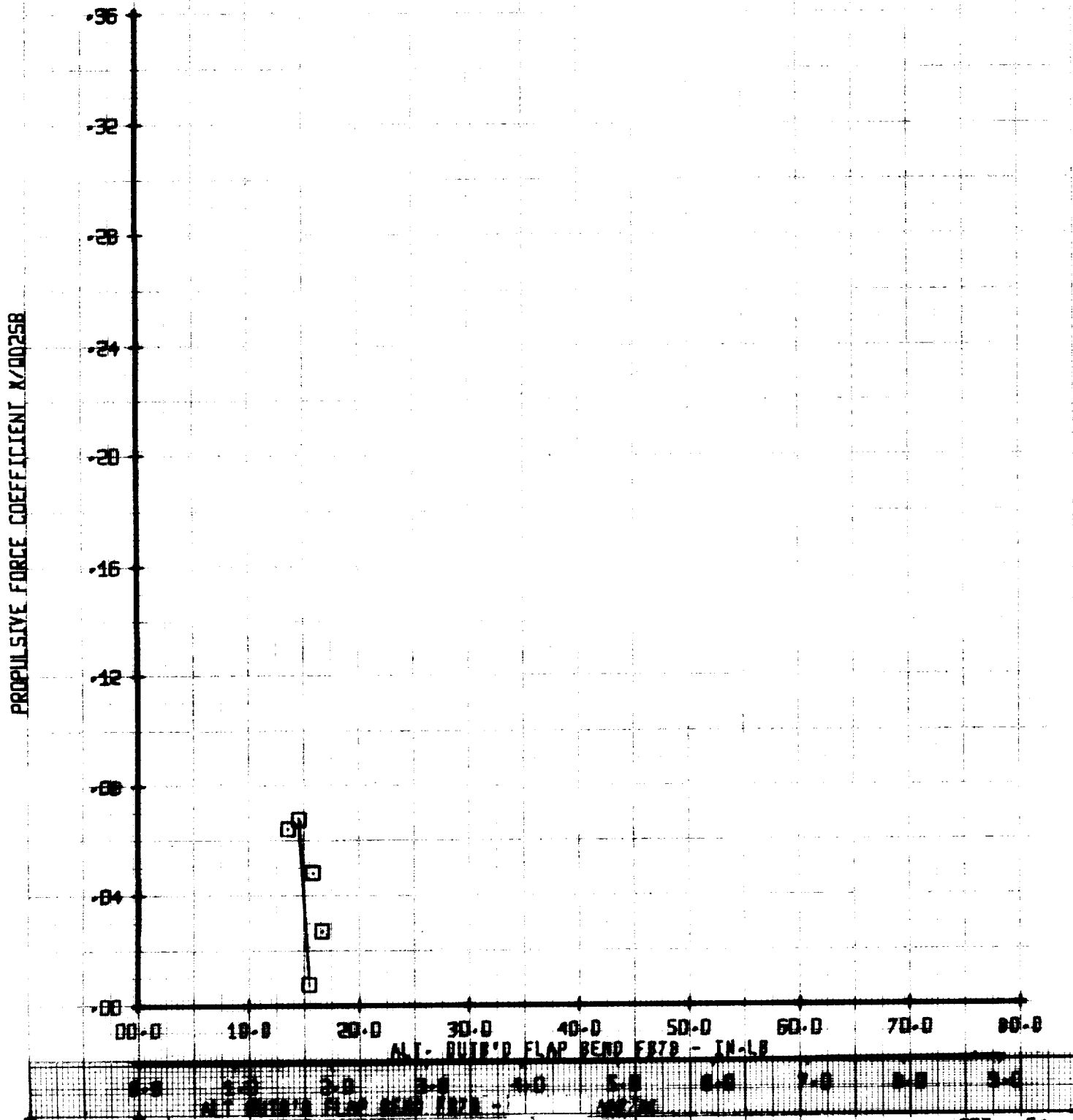


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MLI	CT/58	VTUN
0	239	.61	.04	378
0	238	.61	.055	378

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING OUTBOARD FLAP BENDING FB78

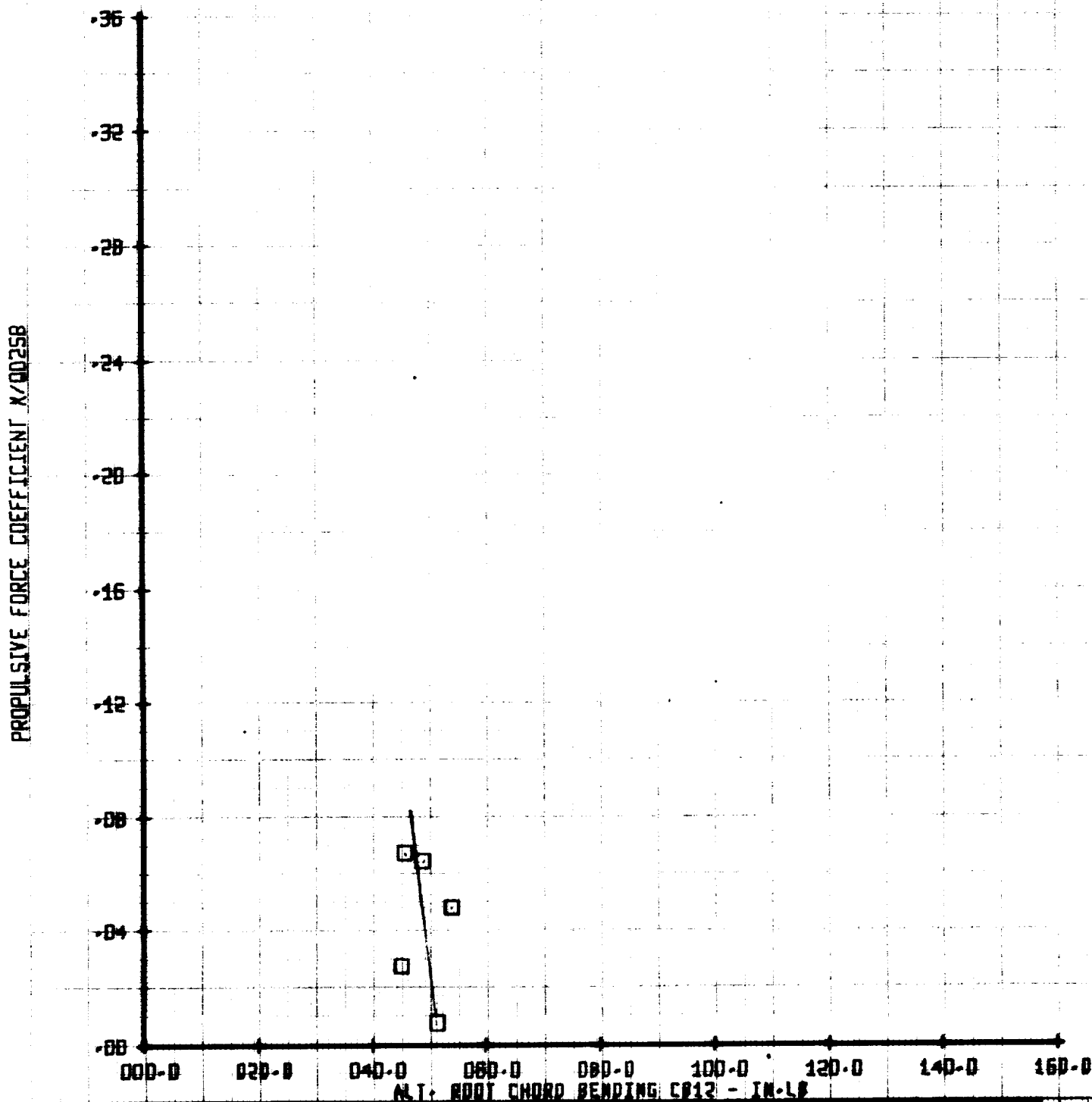


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MLI	CT/5B	VTUM
0	239	.61	.04	37B
0	238	.61	.055	37B

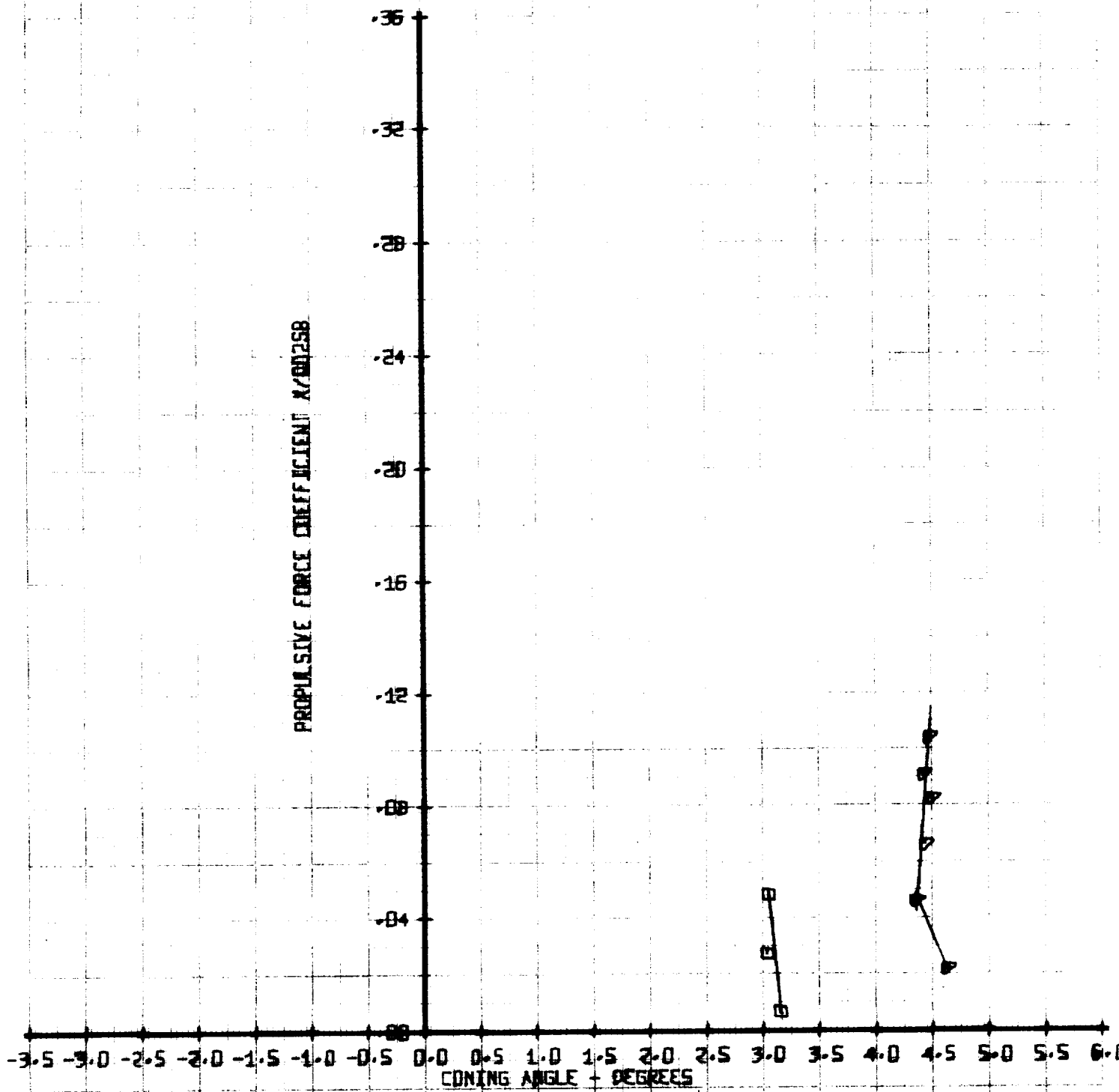
PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT CHORD BENDING CB12



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

SYM		RUN		LEGEND		CT ² /SB		Y RUN	
A	B	239	239	MU'	.61	.04		970	
		238	238	MU'	.61	.055		970	

PROPULSIVE FORCE COEFFICIENT
VERSUS
CONING ANGLE

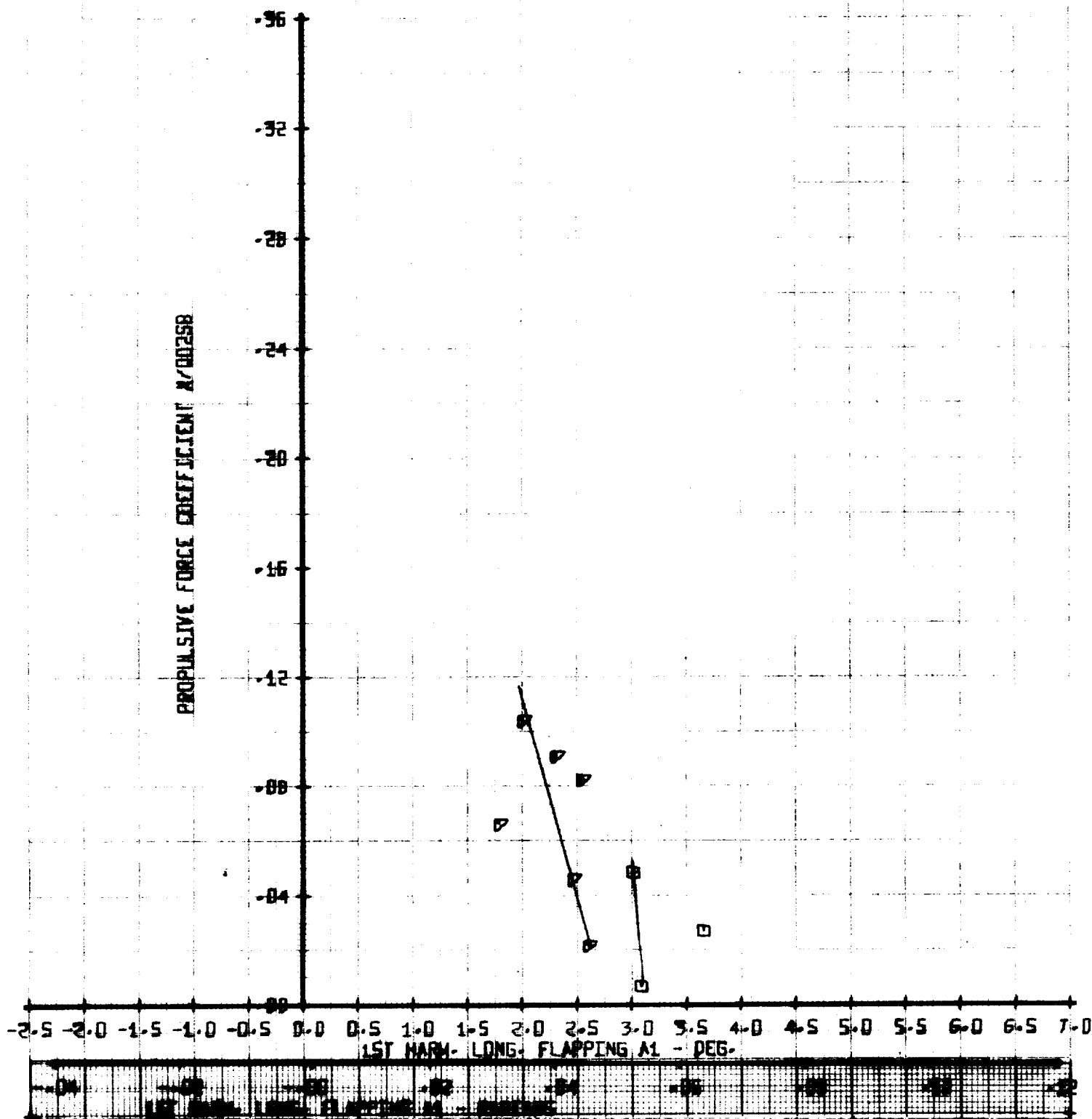


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	YOUN
□	239	.61	.04	37B
△	238	.61	.055	37B

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 1ST HARMONIC LONGITUDINAL FLAPPING A1

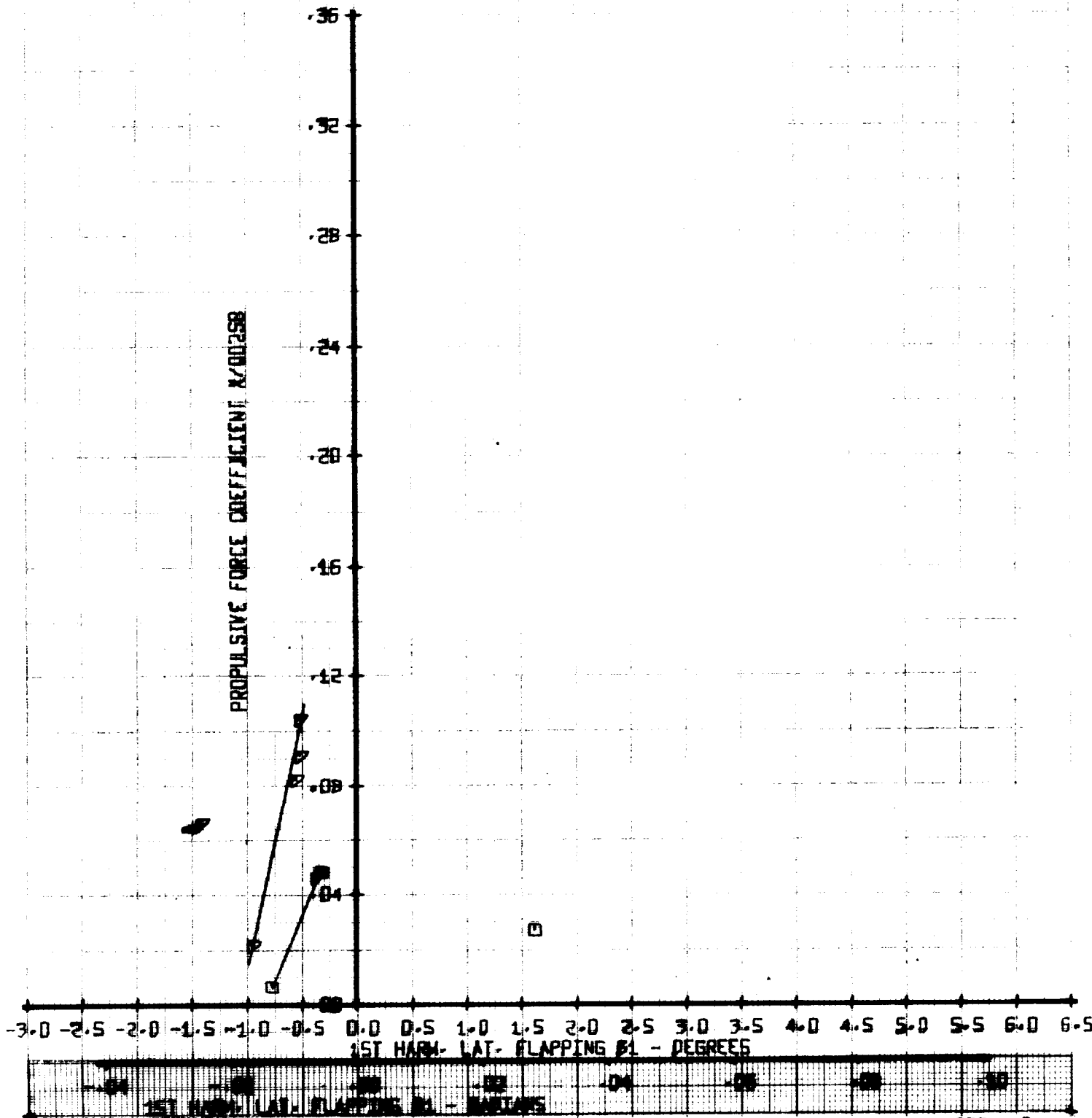


LEFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	YOUN
0	239	-61	-04	378
0	238	-61	.055	378

PROPULSIVE FORCE COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1

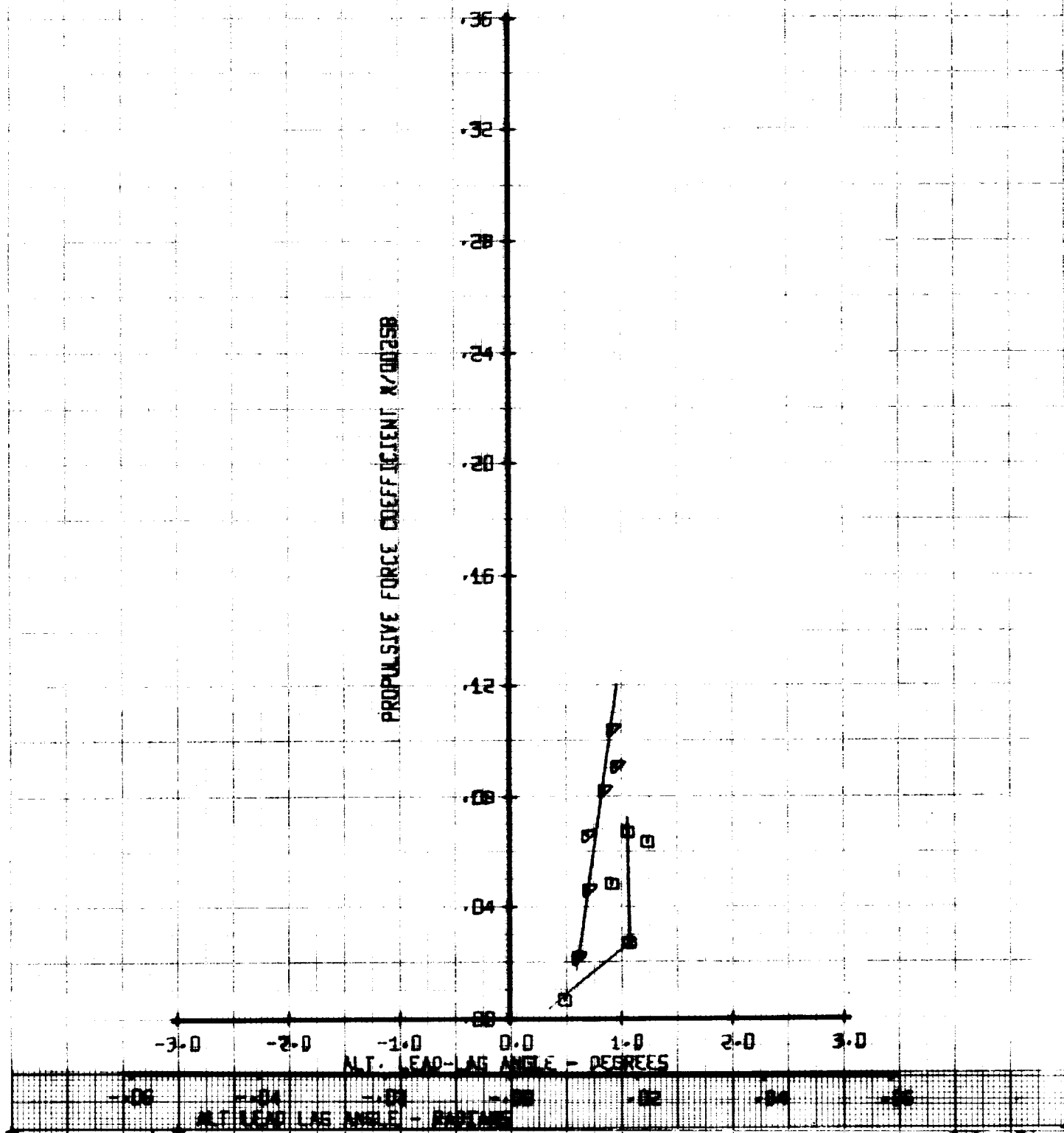


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	MIN	MU'	CT'/SB	VTUN
□	239	.61	.04	378
△	238	.61	.055	378

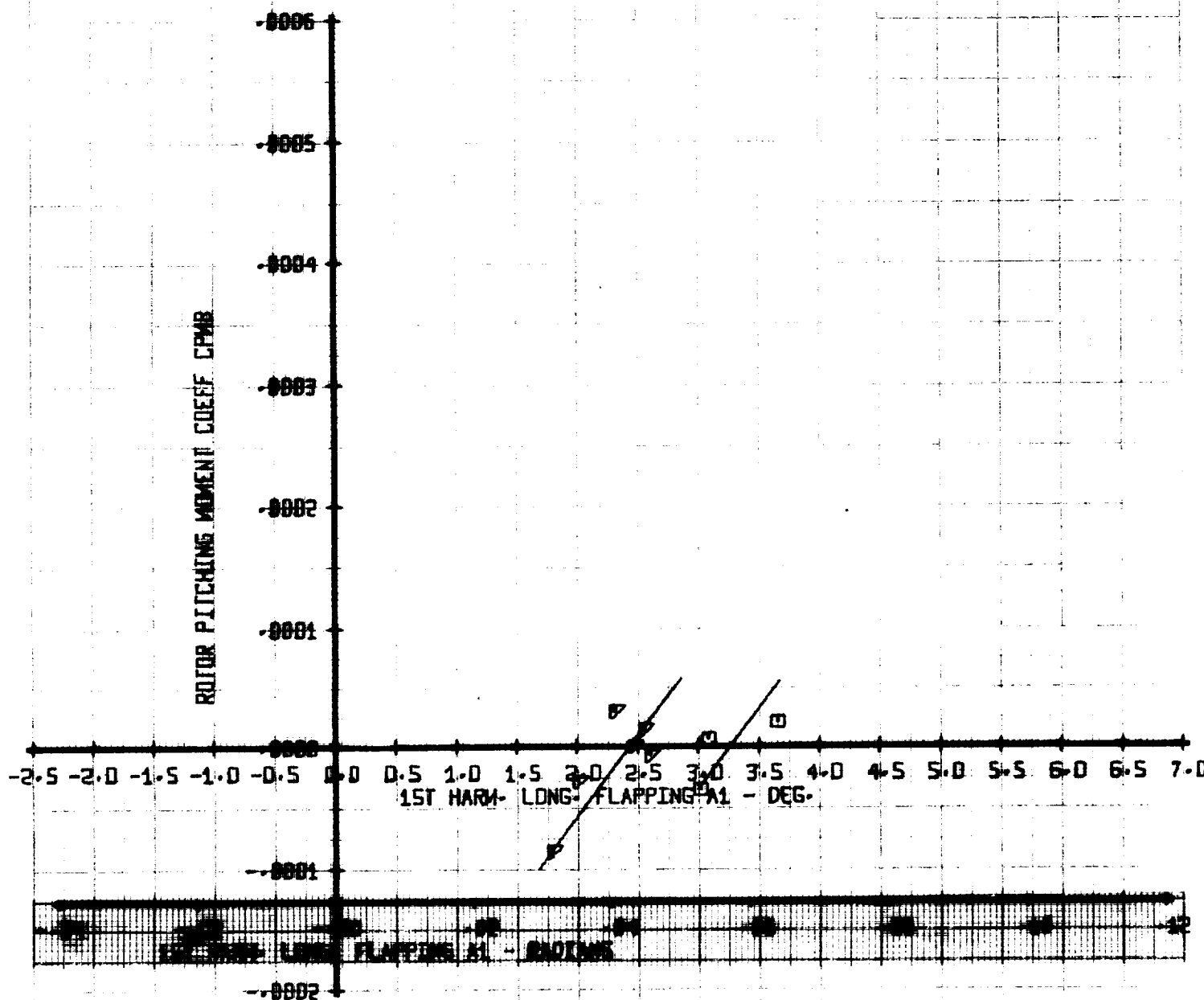
PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING LEAD-LAG ANGLE



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND				
SYM	RUN	MU'	CT'/58	YTLIN
□	239	.61	.04	37B
○	238	.61	.055	37B

ROTOR PITCHING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LONGITUDINAL FLAPPING A1

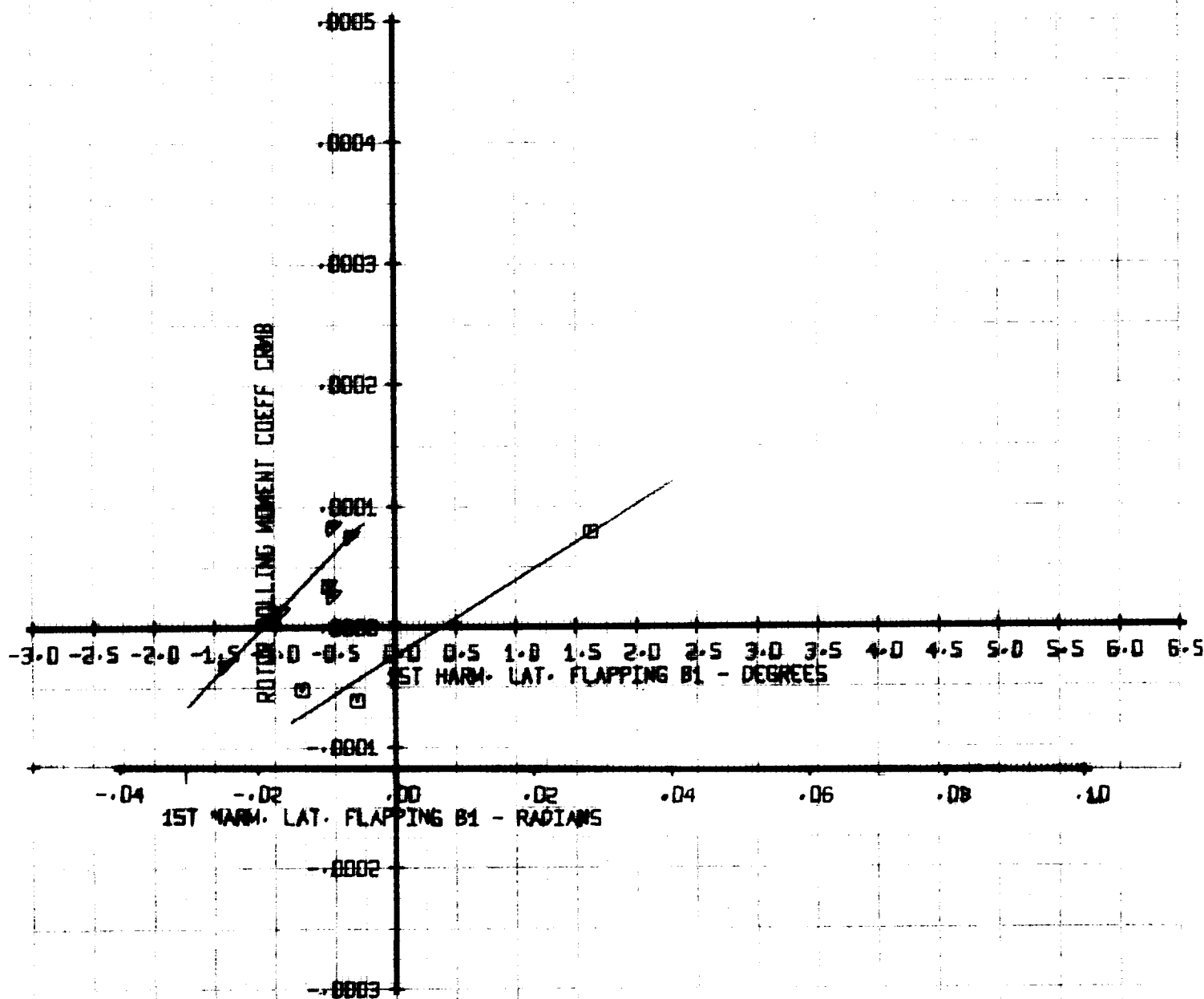


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	YRUN
□	239	.61	.04	378
○	238	.61	.055	378

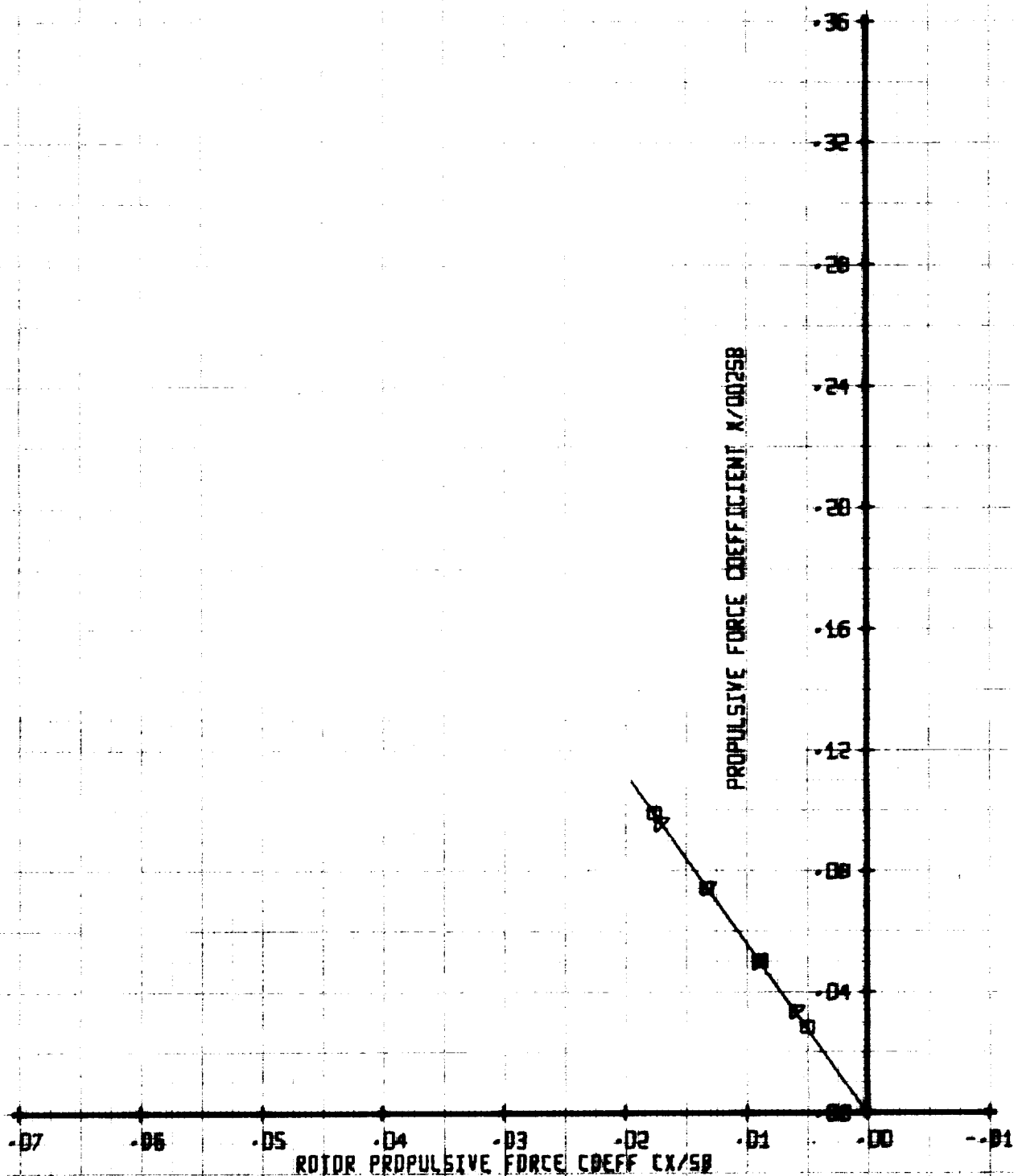
ROTOR ROLLING MOMENT COEFFICIENT
VERSUS
1ST HARMONIC LATERAL FLAPPING B1



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND		CT' / 58	VTUN
SYM	RUN	MU'	
□	276	.53	352
△	277	.53	352

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR PROPULSIVE FORCE COEFFICIENT

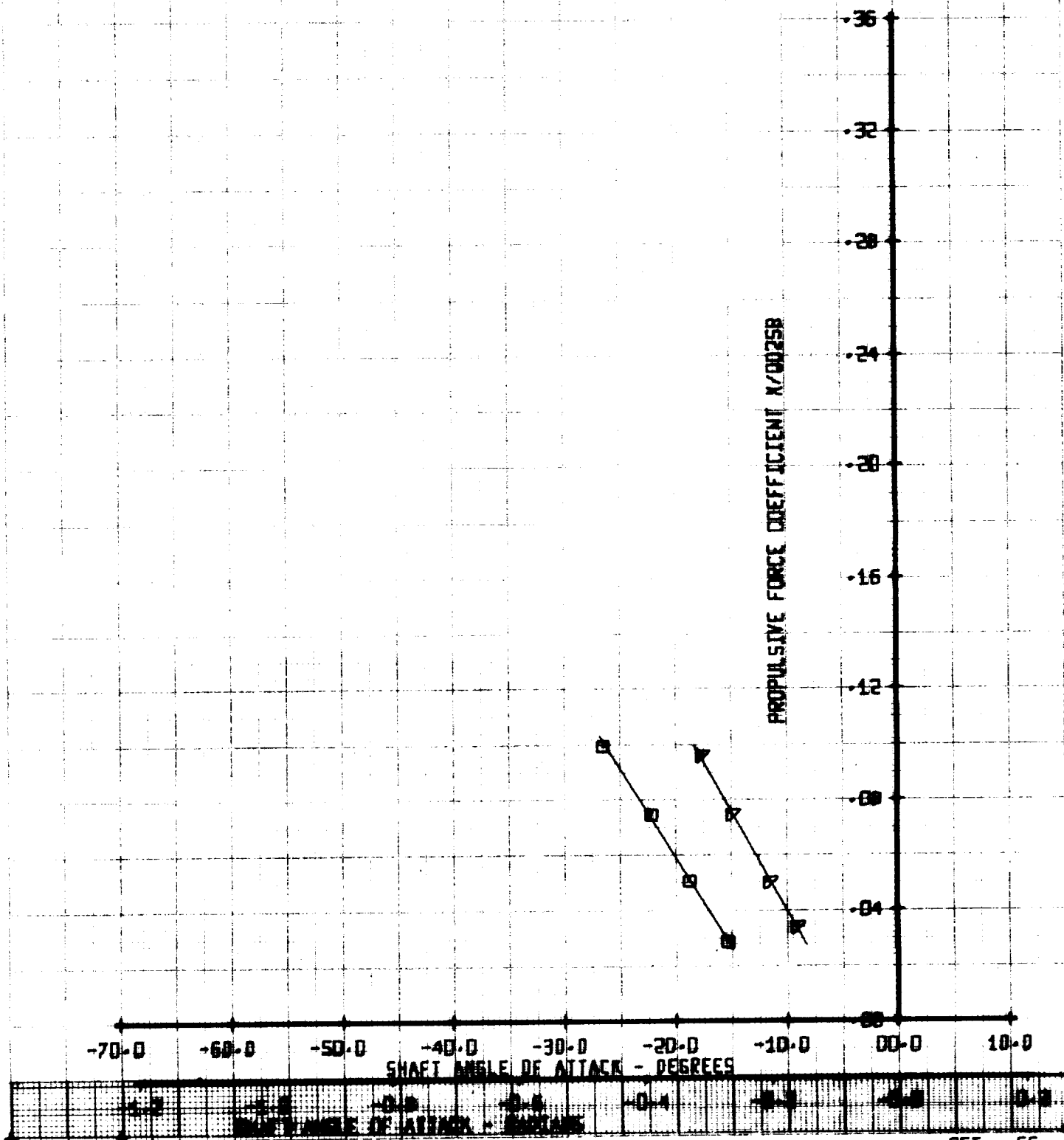


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MI'	CT' / 58	VTIM
□	276	.53	.06	352
▽	277	.53	.08	352

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 SHAFT ANGLE OF ATTACK

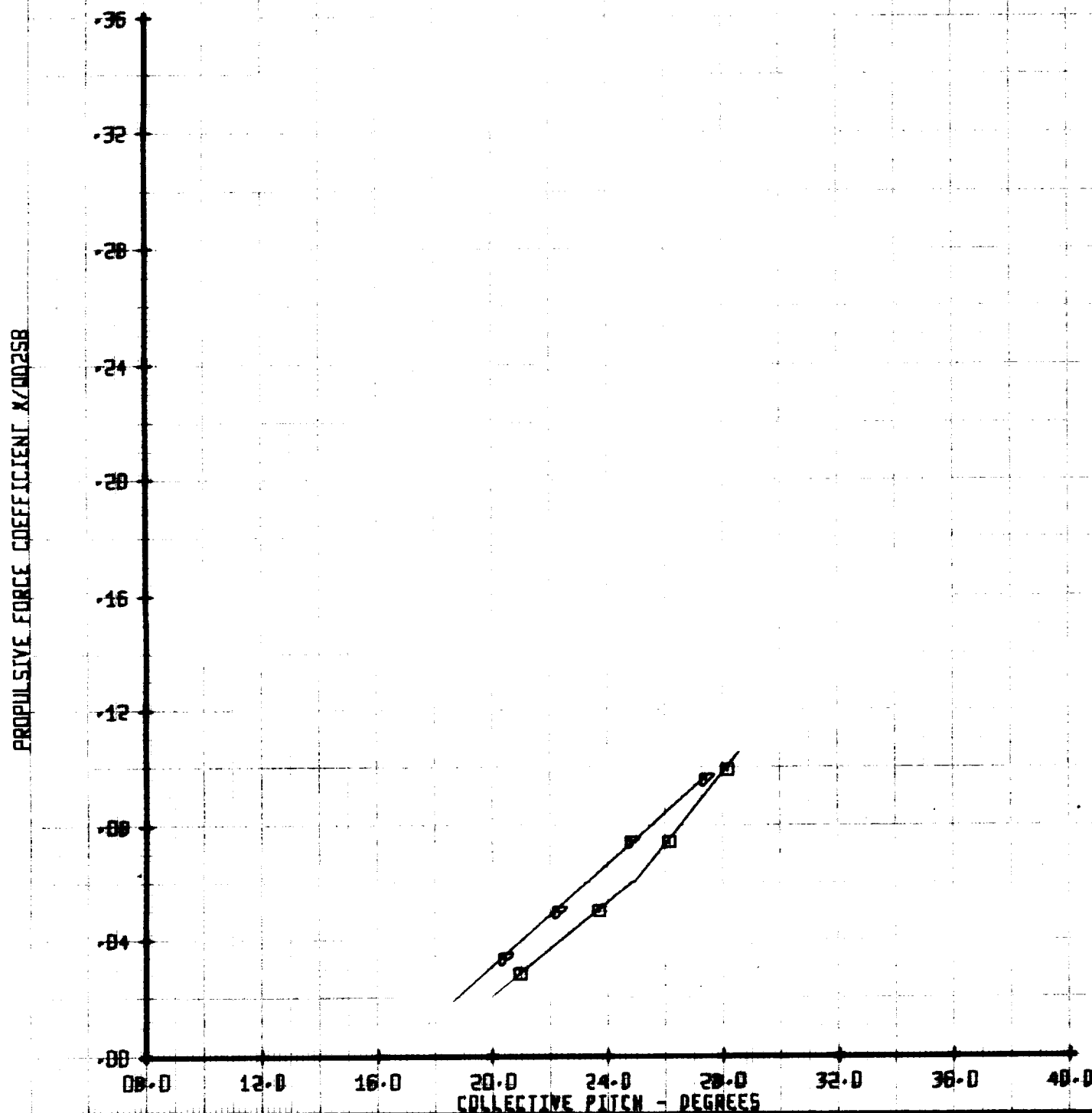


LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/SB	VTUN
□	276	.53	.06	352
○	277	.53	.08	352

PROPULSIVE FORCE COEFFICIENT
VERSUS
COLLECTIVE PITCH



COLLECTIVE PITCH - DEGREES

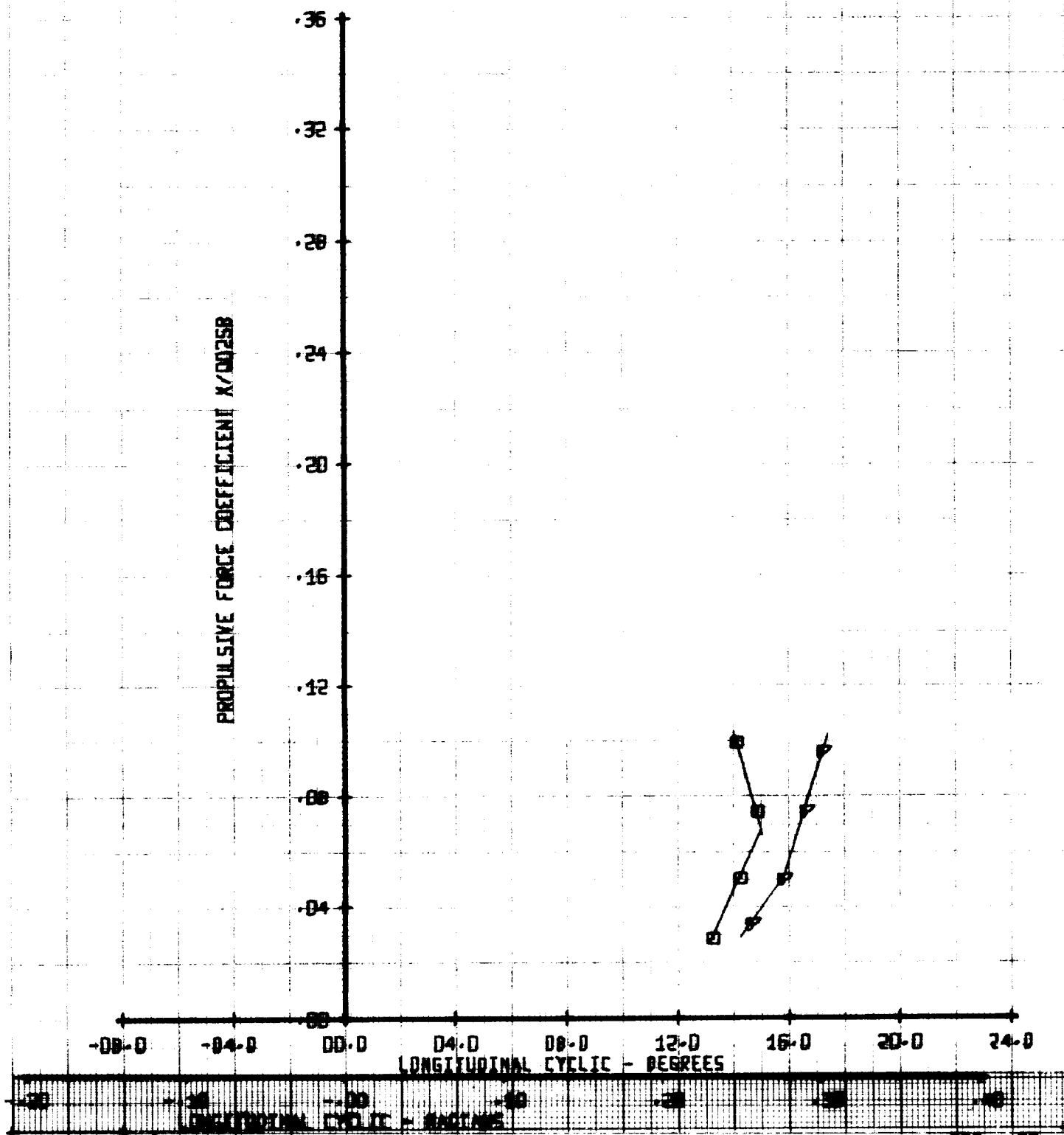
LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / 58	VTUN
□	276	.53	.06	352
▽	277	.53	.08	352

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LONGITUDINAL CYCLIC

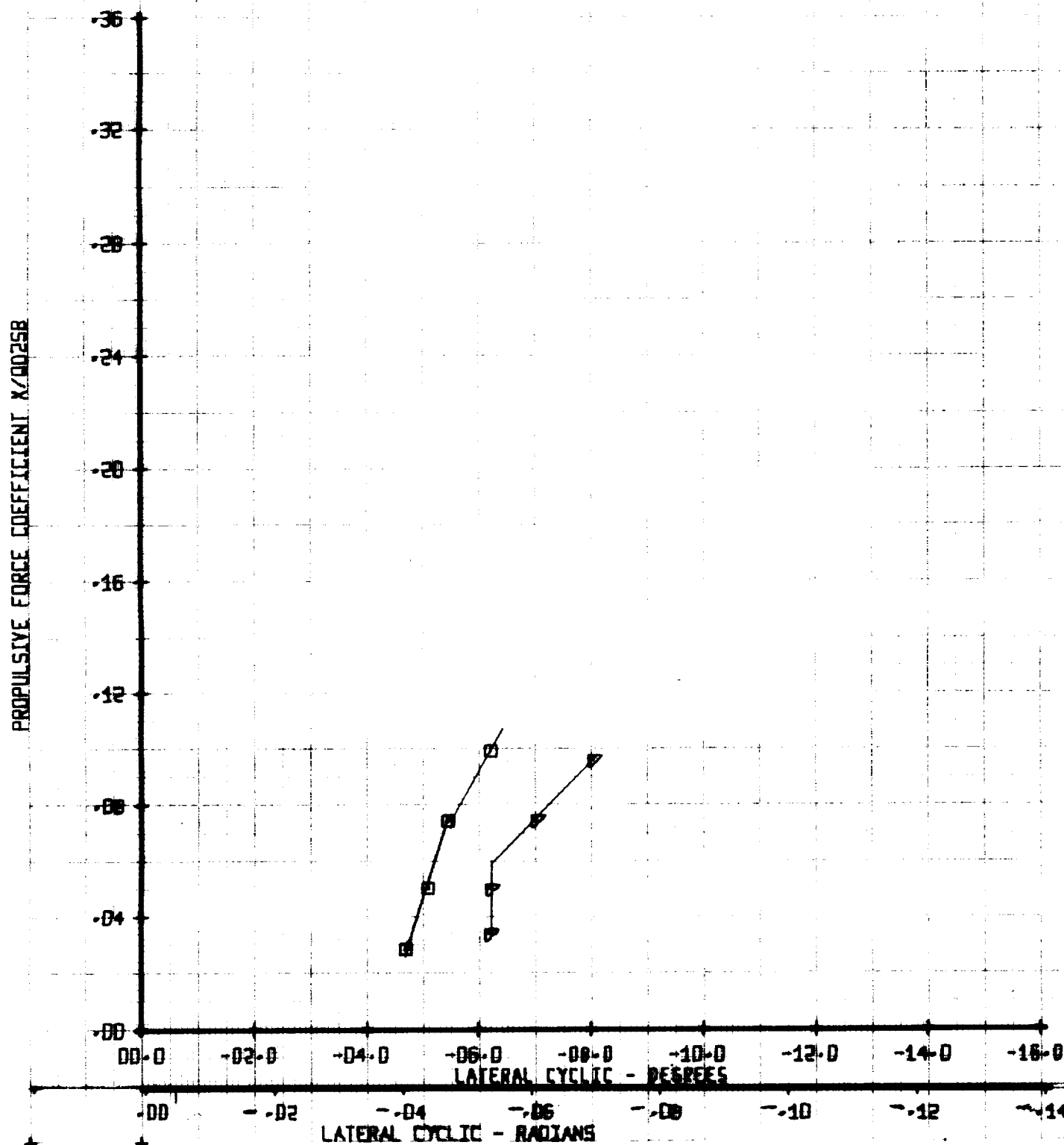
PROPULSIVE FORCE COEFFICIENT X / 00258



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND		CT/58	VTUN
SIM	RUN	MU'	
0	276	.53	352
8	277	.53	352

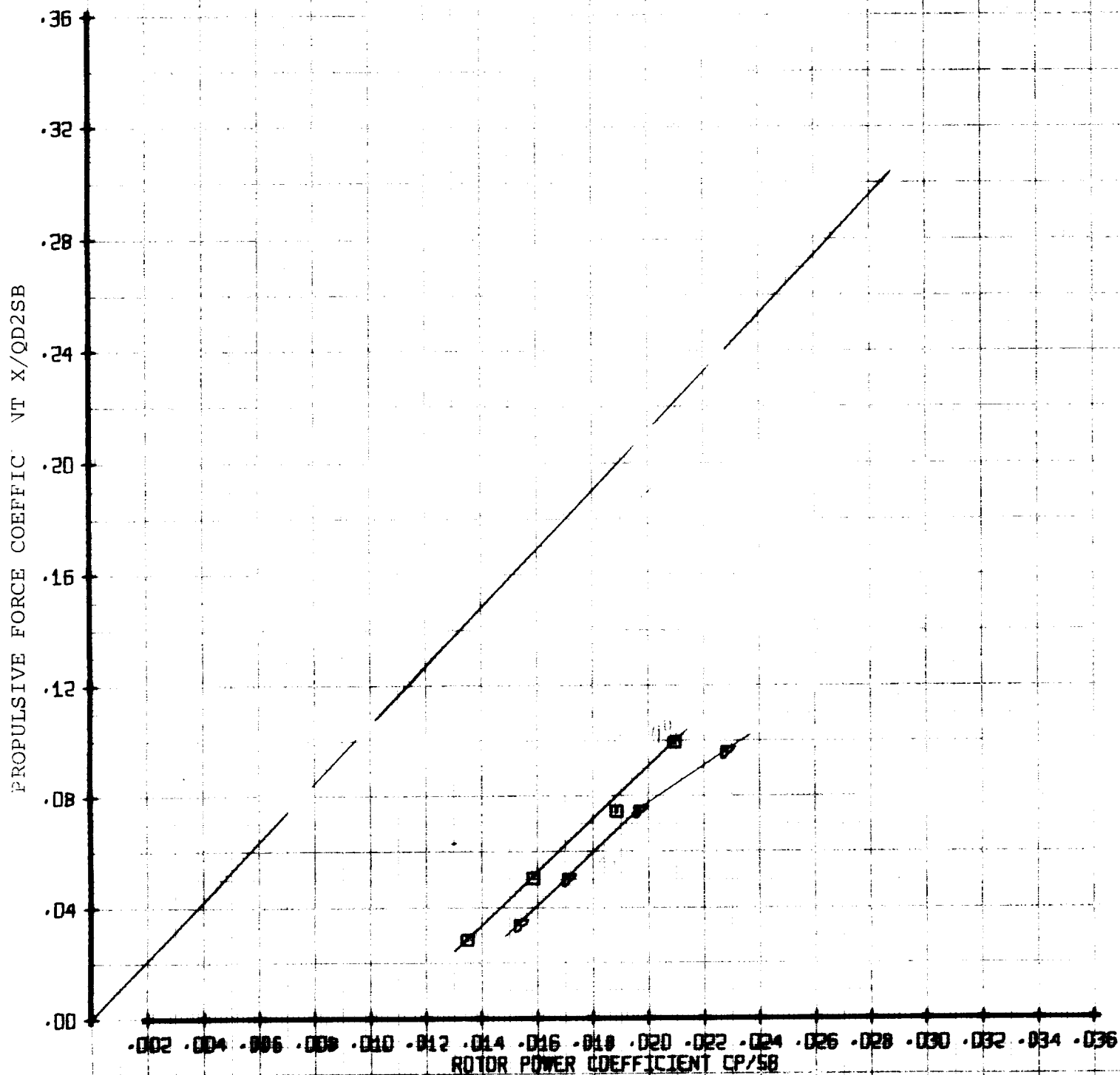
PROPULSIVE FORCE COEFFICIENT
 VERSUS
 LATERAL CYCLIC



LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND		MJ'	CT'58	VTUN
SYM	RUN			
□	276	.53	.06	352
▽	277	.53	.08	352

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR POWER COEFFICIENT



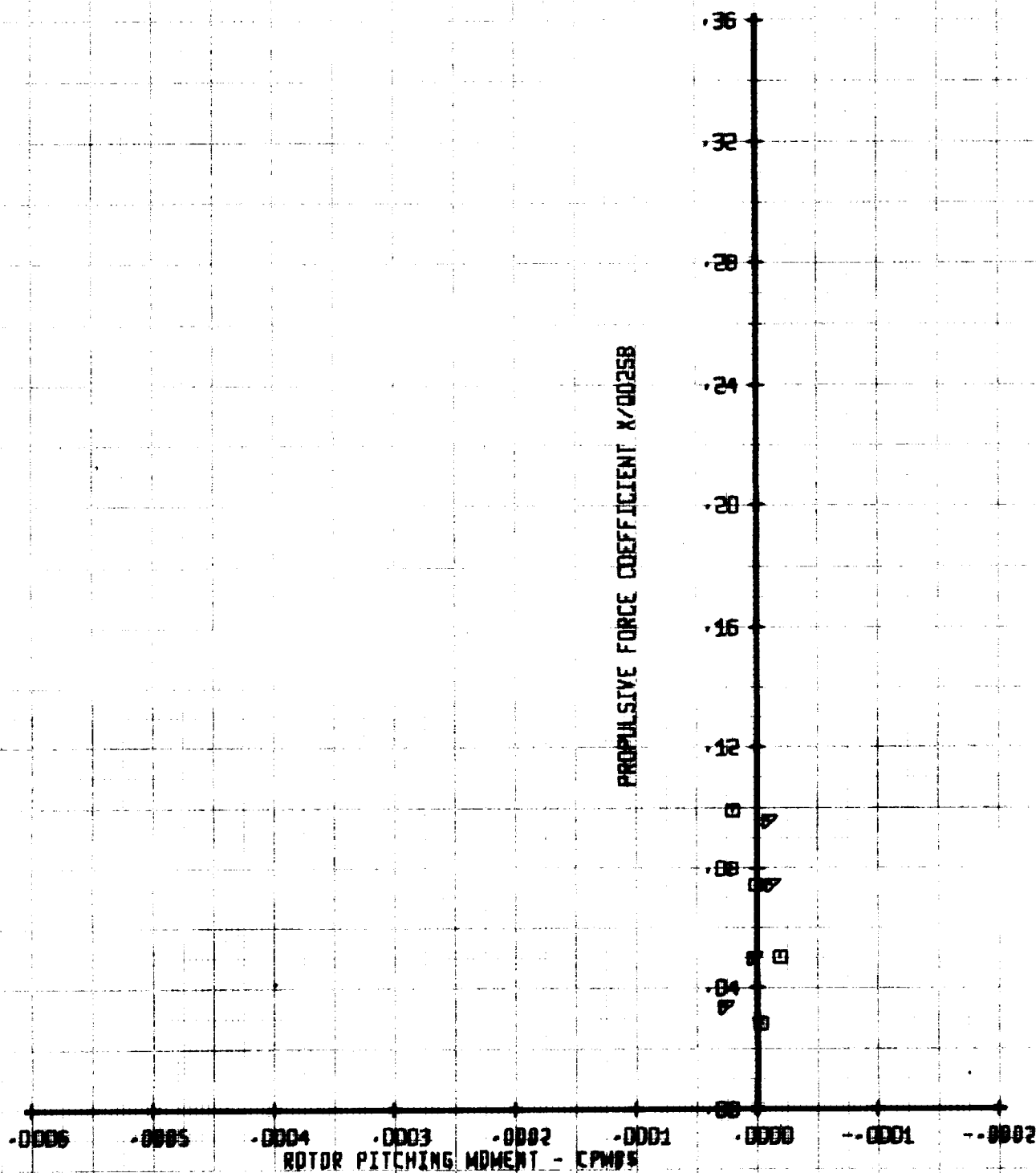
LEFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47B ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM
PRUN
276
277MU'
.53
.53CT'Y5B
.06
.08VTUN
352
352

PROPULSIVE FORCE COEFFICIENT
VERSUS
ROTOR PITCHING MOMENT

PROPULSIVE FORCE COEFFICIENT X/00258

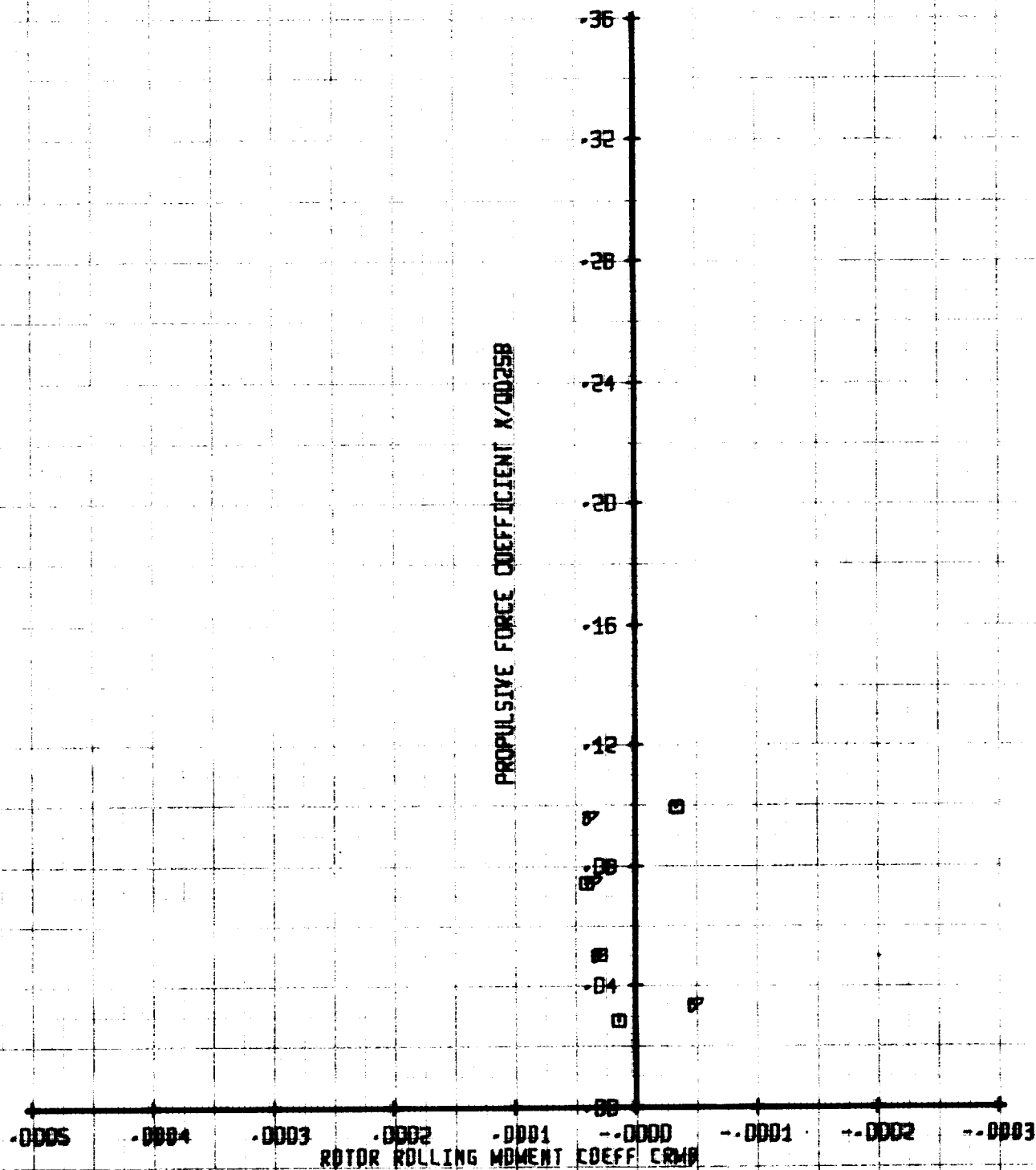


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'Y5B	VTUN
Q	276	.53	.06	352
P	277	.53	.08	352

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR ROLLING MOMENT COEFFICIENT

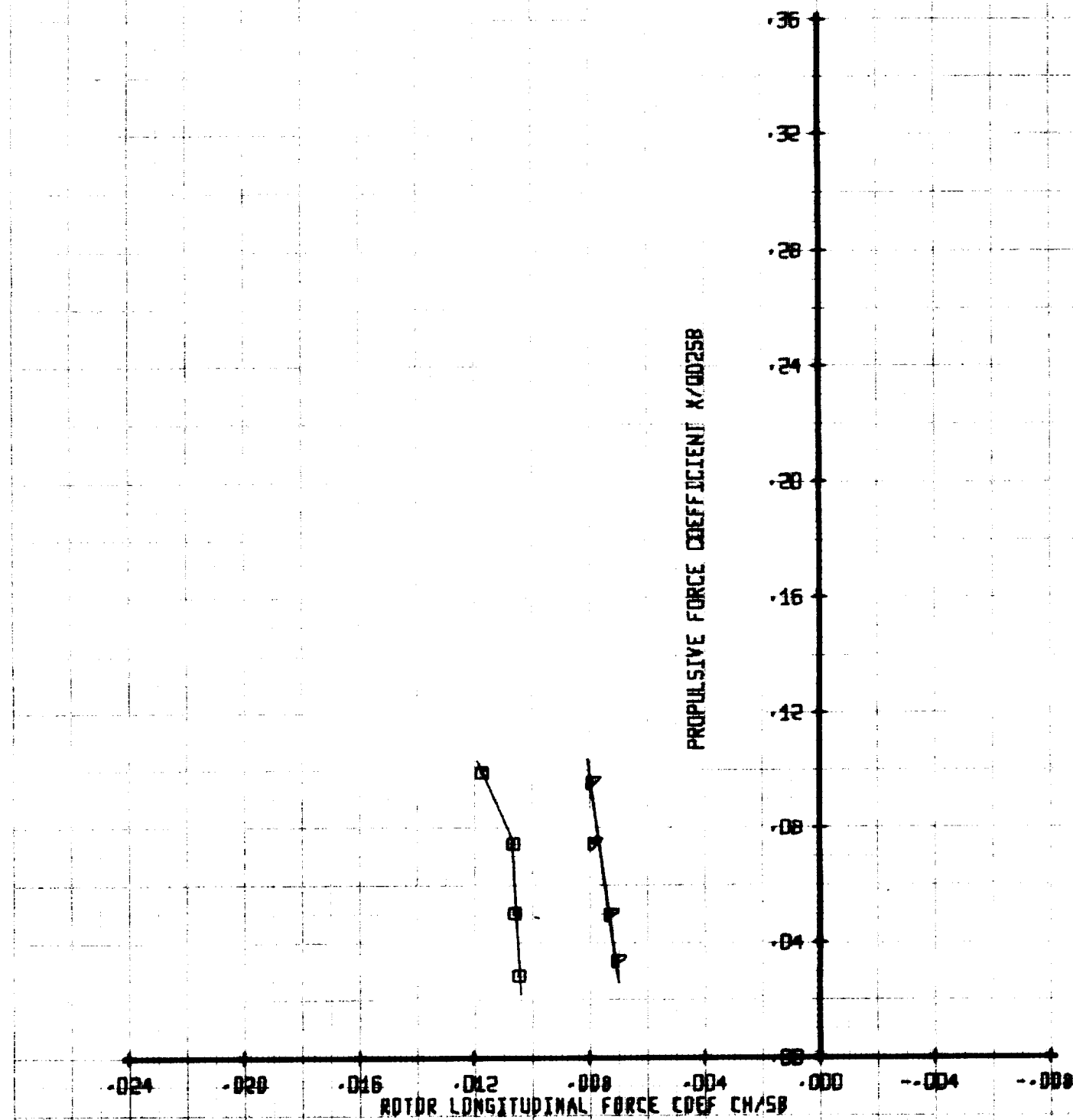


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / 58	VTUN
□	276	.53	.06	352
△	277	.53	.08	352

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR LONGITUDINAL FORCE COEFFICIENT

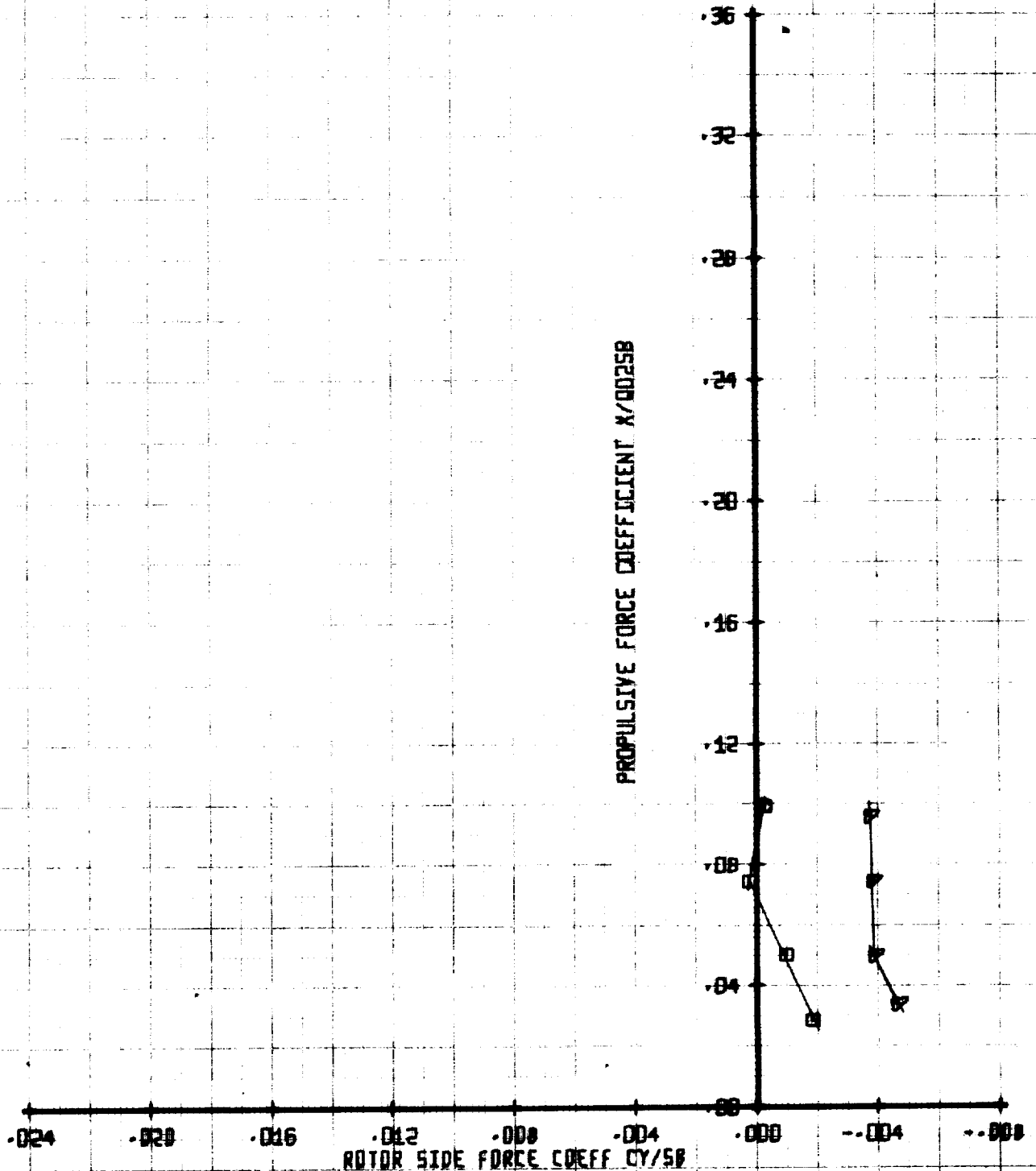


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / 58	VTUN
□	276	.53	.06	352
○	277	.53	.08	352

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ROTOR SIDE FORCE COEFFICIENT



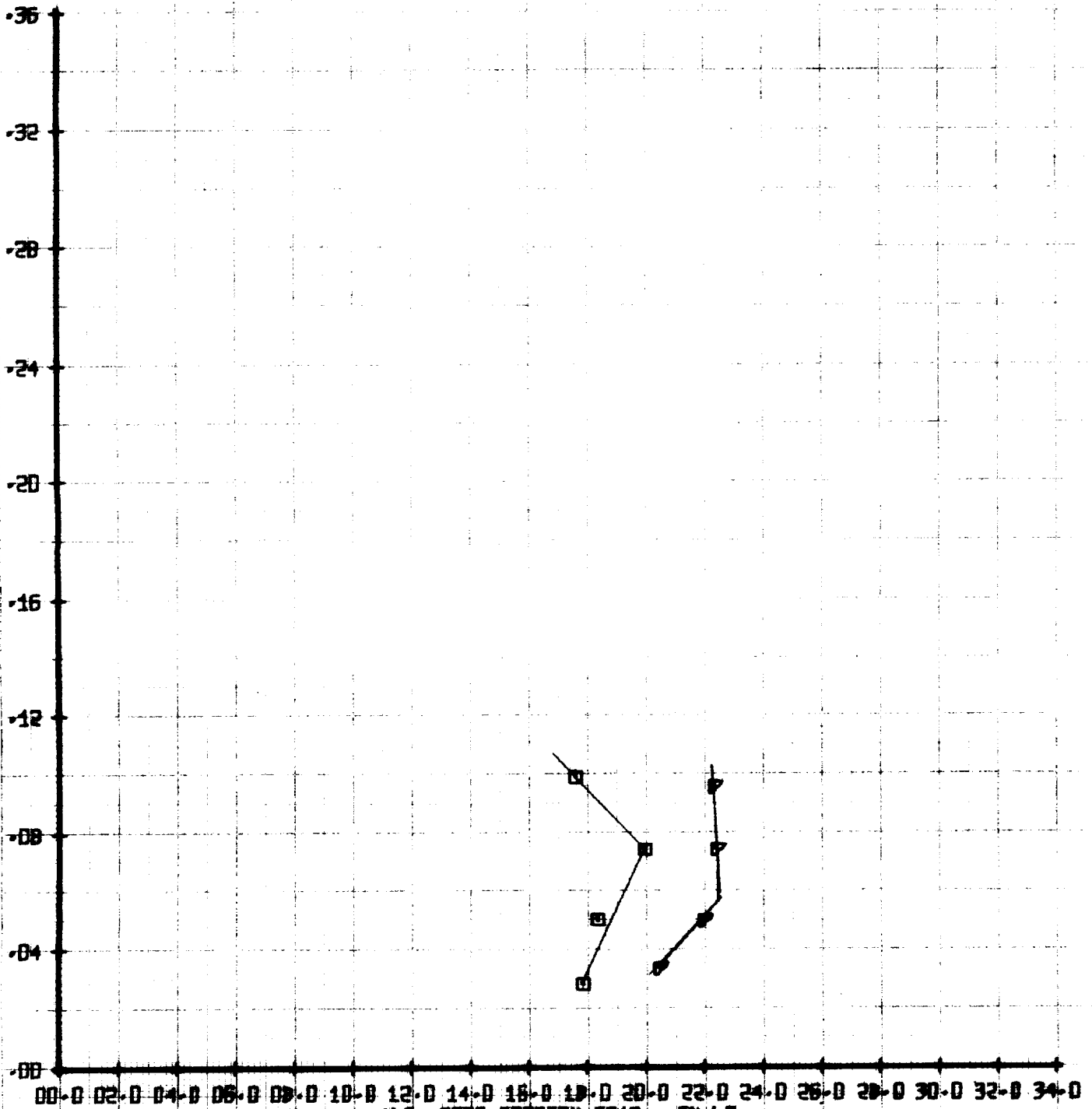
LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT'/58	VTUN
0	276	.53	.06	352
7	277	.53	.08	352

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING ROOT TORSION TB12

PROPULSIVE FORCE COEFFIC T X/00258



ALT. ROOT TORSION TB12 - IN/LB

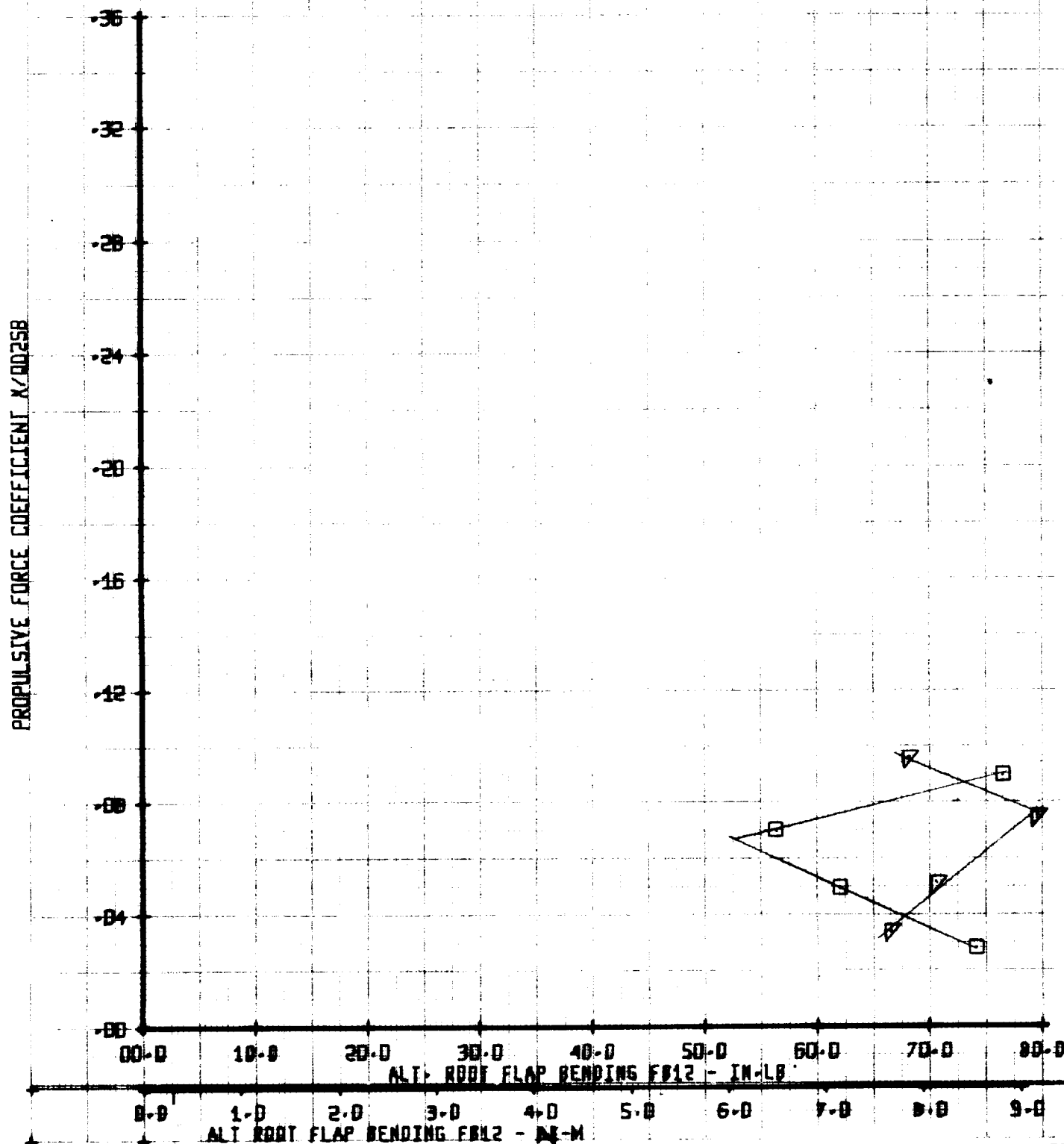
ALT. ROOT TORSION TB12 - IN/LB

LIFT-PROPULSIVE FORCE LIMIT TEST
1/10 SCALE CH-47M ROTOR
PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	ML	CT/58	VTUM
□	276	.53	.06	352
▽	277	.53	.08	352

PROPULSIVE FORCE COEFFICIENT
VERSUS
ALTERNATING ROOT FLAP BENDING FB12

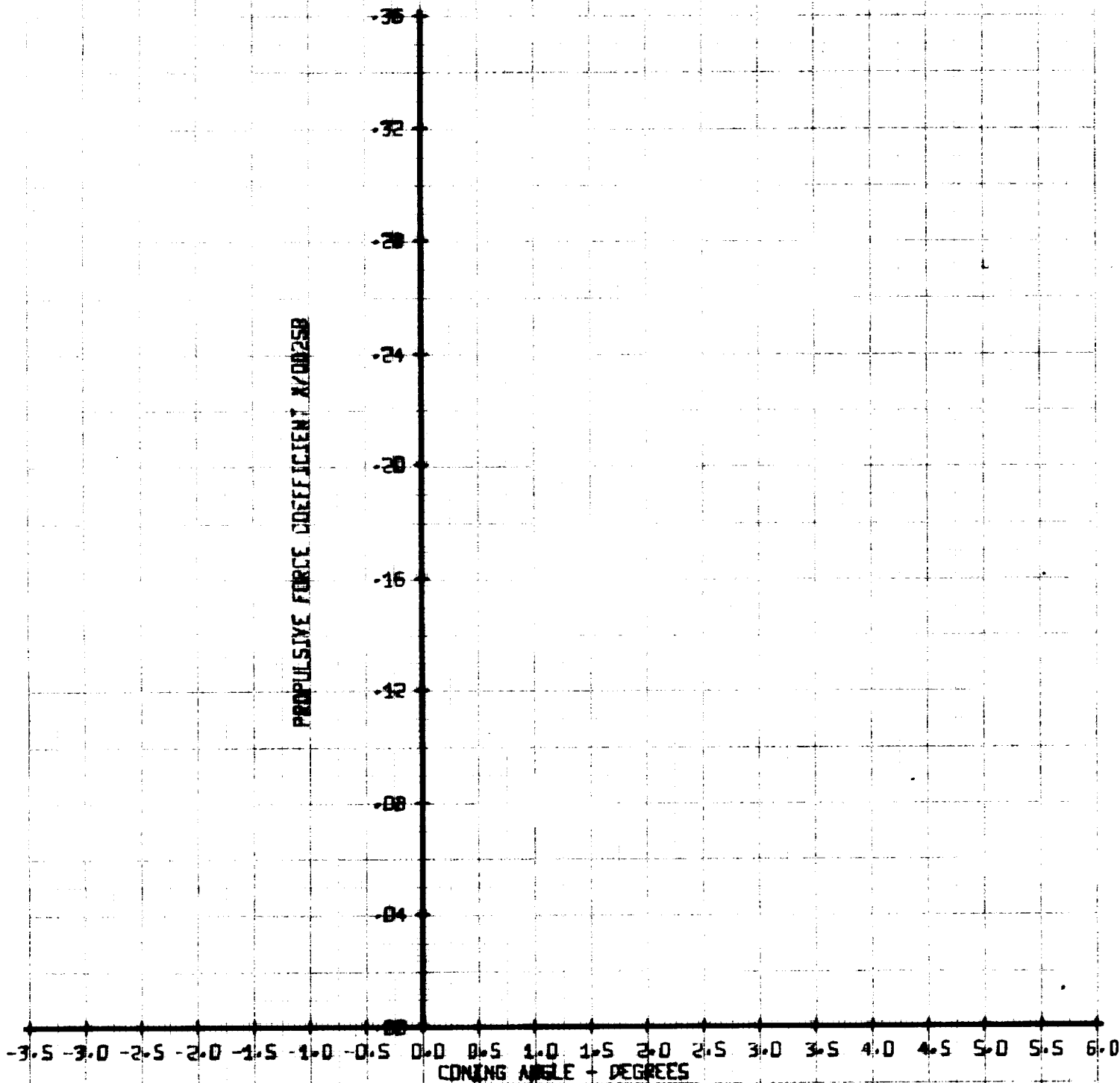


LEFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CN-478 ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / 258	YTLIN
Q	276	.53	.06	352
P	277	.53	.08	352

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 CONING ANGLE



B-224

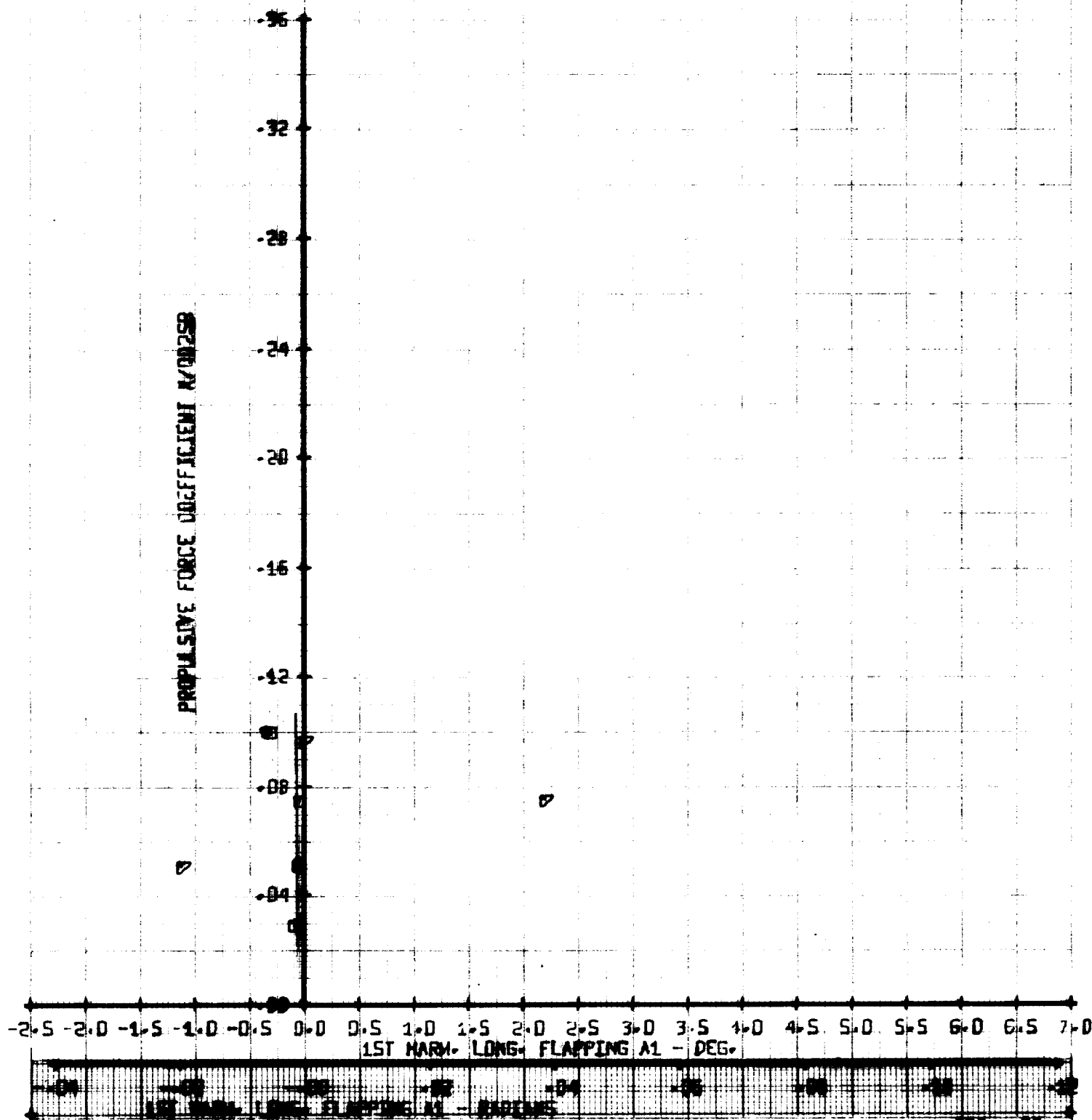
SET SS
 BVWT 193

LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MU'	CT' / SB	YTLIN
U	276	.53	.06	352
V	277	.53	.08	352

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 1ST HARMONIC LONGITUDINAL FLAPPING A1

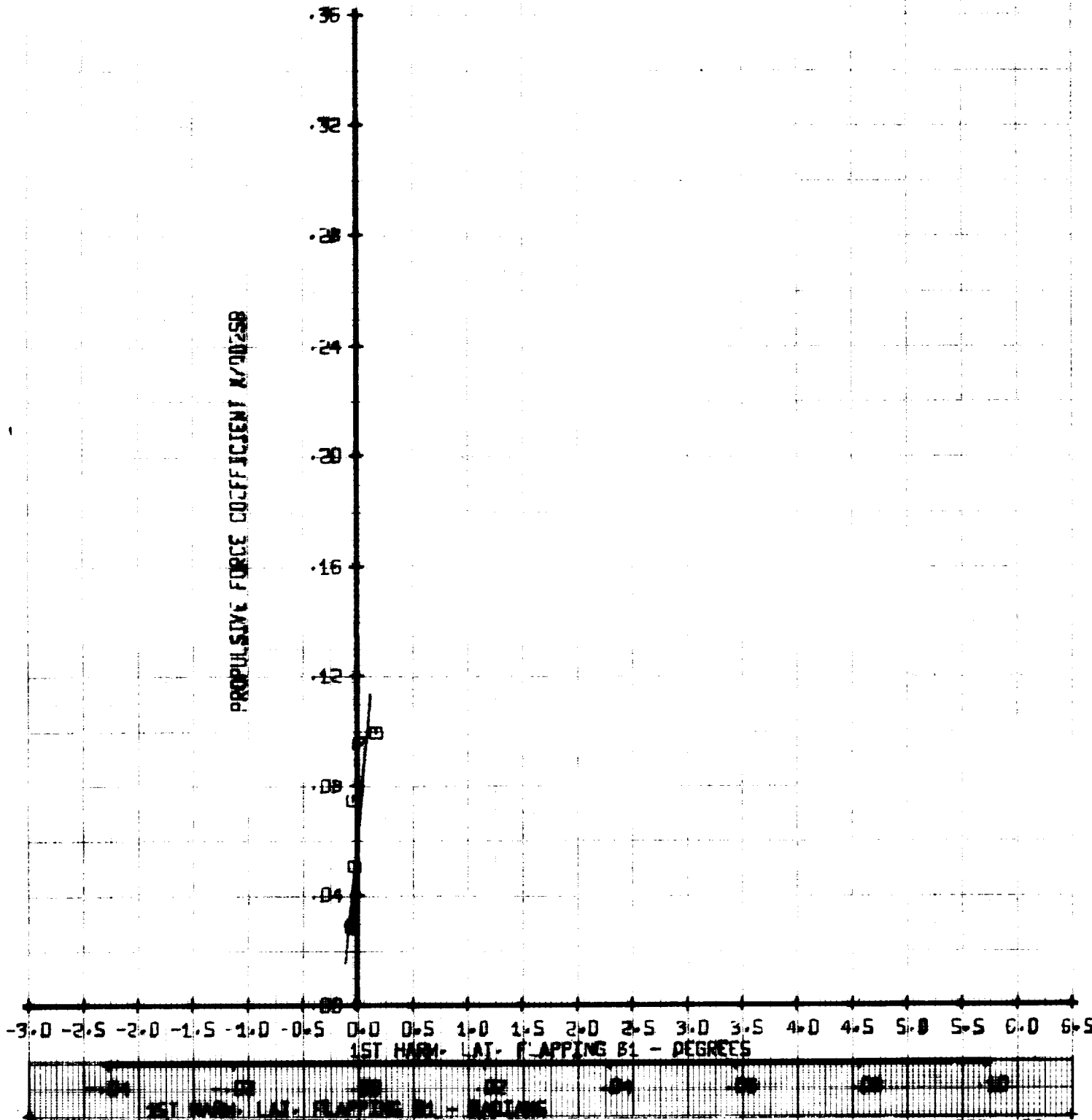


LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE OH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	BLIN	MLI'	CT'25B	YILIN
□	276	.53	.06	352
○	277	.53	.08	352

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 1ST HARMONIC LATERAL FLAPPING B1



LIFT-PROPULSIVE FORCE LIMIT TEST
 1/10 SCALE CH-47B ROTOR
 PROPULSIVE FORCE LIMIT TESTING

LEGEND

SYM	RUN	MLI	CT/58	VTUN
0	276	.53	.06	352
9	277	.53	.08	352

PROPULSIVE FORCE COEFFICIENT
 VERSUS
 ALTERNATING LEAD-LAG ANGLE

